

CHAPTER III.

CULTURE AND CURING OF TOBACCO IN ARKANSAS.

The production of tobacco in Arkansas is comparatively a new industry, and is confined to a few counties, chiefly in the northwestern corner of the state. The quality of the tobacco grown is very similar in every respect to that produced in Virginia. The tobacco-growing portion of this state is in the same latitude as that portion of North Carolina which produces the finest yellow leaf in the United States, and the heavy, dark types are taking a high rank for the Regie trade.

While the chief agricultural products of the state are cotton and corn, there are large areas which, in soil and climate, are well adapted to the growth of small grain and of tobacco. This is especially true of the elevated plateaus in the northern part of the state west of Black river, comprising the counties of Randolph, Izard, Newton, Boone, Madison, Carroll, Benton, and Washington. These counties in 1870 produced two-thirds of the tobacco grown in the state. The soil on which the great bulk of the crop was grown is chiefly derived from the disintegration of the magnesian and subcarboniferous limestones. The weathering of these limestones does not at any place give a heavy or impervious soil, as the siliceous constituents in both formations give porosity and furnish sand enough to make the soil loose and of easy cultivation. With a subsoil of red clay they retain manures for a long time, and no soils in the United States respond more readily in all seasons to manurial applications.

The census of 1840 returned for the state of Arkansas 148,439 pounds; of 1850, 218,936 pounds; 1860, 989,980 pounds; 1870, 594,886 pounds; and by the returns of the enumerators in 1880 the state, in 1879, produced 970,220 pounds, showing a small decrease as compared with that produced in 1859, but an increase of 63 per cent. as compared with the crop of 1869. Of the product of 1879 the counties of White, Independence, Madison, Boone, Washington, and Benton produced 531,494 pounds, the last-named county alone producing 395,982 pounds, being more than three-fifths of the amount reported for the whole state by the census of 1870.

BENTON COUNTY DISTRICT.

The surface of Benton county, the only one in the state that produced over 100,000 pounds of tobacco, is rolling, with numerous tracts of elevated table or prairie land. Alike in surface features are Boone, Madison, and Washington. The town of Fayetteville, in the latter county, has an elevation of 1,350 feet above the sea, and a prairie in Madison county has an elevation of over 1,000 feet. The streams run in deep valleys, cut down through these plateau lands, from which they are fed by never-failing springs.

No extensive series of observations have ever been made in the tobacco-growing region of Arkansas. The elevation of Benton county is between 800 and 900 feet greater than that of Fort Smith, the latter being 460 feet above the sea. The center of Benton county is about one degree farther north. At Fort Smith a period of observation covering nineteen years and three months shows the temperature of spring to be 60.79 degrees; of summer, 78.48; of autumn, 60.65; and of winter, 40.55; mean for the year, 60.12. The difference in elevation and in latitude would probably make a difference in the annual temperature of between two and three degrees. The rain-chart constructed under the direction of Professor Joseph Henry shows that the annual precipitation in Benton county varies from 32 to 44 inches.

VARIETIES OF TOBACCO GROWN.

The White Burley, which grows in the tobacco districts of Arkansas, is very large, giving it a rough appearance, and, in consequence of its size, many of the leaves, in growing, touch the ground. The Virginia Golden Leaf is also grown to a considerable extent, and is very rich, oily, and smooth, with stem and fiber small. It also matures early and cures easily, and is the favorite for fillers. The Yellow Pryor and the Orinoco are nearly equal in good qualities, but do not produce as fine a leaf. The two latter varieties are richer in oily substances than the White Burley, and are not so fragrant or heavy in body as the Virginia Golden Leaf, but are very useful for plug work.

The relative proportion of types has varied greatly within the last decade, as illustrated by the following:

Type.	1870.	1880.
	<i>Per cent.</i>	<i>Per cent.</i>
Dark shipping.....	15	42
Fillers.....	30	10
Bright wrappers.....	5	8
Cutting.....	20	.....
Nondescript.....	30	40

It will be seen that the nondescript and shipping leaf have been largely reduced, while the higher grades have all increased, except bright wrappers.

In northern Arkansas this improvement has been very marked since 1877, especially in grades suited for domestic consumption. The production of the heavy shipping qualities is avoided as much as possible. The

comparatively poor, dry, silicious soils, producing from 500 to 600 pounds per acre of half bright or good bright wrapping leaf, which sells from 10 to 30 cents per pound, yield a far better return to the planter than the rich red-clay soils or manured lots, which produce larger crops of ordinary shipping leaf, bringing only 3 or 4 cents per pound. The thin soils are easily cultivated, as no rank weeds shoot up to interfere with the growth of the crop.

The beds of limestone are approximately horizontal, and the clayey beds which overlie them absorb water slowly, especially upon the level prairie lands. In their wild state a rank vegetation springs up upon these level, almost treeless plains, and in time forms a thick mat of humus, which, commingled by cultivation, makes a very rich soil. When cherty beds occur along with the clay, the land is much better drained. Where there is a predominance of clay the soils are cold, but the gravel of the chert, when present, warms up such soils, and gives a quick growth to the crops planted upon them. Usually the cherty soils have in their original condition a scanty growth of hickory and black-jack, with an undergrowth of hazel. These loose, dry, siliceo-calcareous and argillaceous soils are seldom affected injuriously by either wet or dry seasons unless the maximum is extreme. When freshly cleared the tobacco grown on them has an exceedingly fine, silky texture, a golden color when cured, and a rich aroma. In the language of one of the schedules, "The soil preferred is a gravelly loam, rich, red, deep, and light, with a subsoil of reddish clay"—freshly cleared land, on which the original growth was as indicated above. Another describes the best soil for heavy tobacco as the black loam of bottom lands, and for fine tobacco flat hickory land, the latter gray in color, with a reddish-yellow subsoil, warm and dry. The land is carried in tobacco two years, the quality of the second year's growth being much heavier and better suited for shipping leaf than for wrappers. It is observed that the color of the under-clay has much to do with the quality of the tobacco. Very red under-clays, free from gravel, will not make a type so fine as lighter clays, but the product is heavier. No difference, however, is seen in the product of level or rolling lands, provided they be equally well drained and of similar soils.

It is estimated that 40 per cent. of the soils preferred for the growth of the better types of tobacco is occupied in the county of Benton, and that 70 per cent. of the wooded lands is adapted to its growth.

The usual practice to prevent a rapid deterioration of soil is to sow wheat at the end of the second year, and upon this crop of wheat, in the following spring, clover. Two crops of clover are allowed to mature, which are sometimes depastured with stock, but often suffered to fall down and decay upon the land for its enrichment.

While the finest tobacco is grown upon lands which had an original tree covering of hickory and black-jack, it is noted that a soil with a tree growth of walnut and wild cherry—always indicative of fertility—will make a broad shipping leaf, color dark brown, fiber large, but leaf pliant and full of oil.

In relation to these two classes of soil, namely, the black-jack and hickory soil, with light reddish clay, and the walnut and cherry soil, with a deep red under-clay, some curious facts were brought to light by Dr. Peter, the chemist of the geological survey. Taking two samples of the first class, one virgin and the other having been under cultivation for twenty years, it was found that by cultivation the soil had lost in organic matter, oxide of iron, carbonate of lime, and magnesia, but the silica, potash, soda, and phosphoric acid were increased, the first by 3 per cent., the second by 20 per cent., soda by 38 per cent., and phosphoric acid by 81 per cent. The loss, however, in all these elements was very large in a comparison of two analyses of virgin soil and of soil long under tillage taken from Washington county, where the timber growth was walnut and cherry and the subsoil a deep red clay.

Very little fertilizing is done for the tobacco crop, mainly because fresh lands are largely employed in its growth. In making the heavier grades of shipping leaf sometimes from two to four tons of manure are applied broadcast upon an acre, but the effect is to increase the yield at the expense of quality. A few farmers apply the manure in the hill.

PLANTING AND CULTIVATION OF TOBACCO.

Seed-beds are burned and prepared in all respects as in Tennessee and Kentucky. These beds are sown at any time from December 20 to March 15, and the plants are large enough for transplanting from May 10 to June 25. For fancy or fine crops the earlier the plants are set the better, as bright colors are more easily made when the tobacco is cured before the advent of cool weather. Old lands require larger plants than new.

The preparation of the soil for receiving the plants depends upon the quality of the tobacco to be produced and whether the land be old or new. For the finer kinds a light plowing, only 3 to 4 inches deep, is given. For heavy shipping leaf deep and thorough breaking is done, 7 or 8 inches in depth for old land, first during the winter, if possible, and again in April or May. New lands are well grubbed, broken with coulter once or twice, then with turning plow twice, followed with a heavy harrow after each breaking. Subsoiling is not practiced in preparing the land for growing a crop of tobacco, but is found to be very beneficial for other crops. Harrowing the land several times is regarded as indispensable to putting the soil in good condition. Old land is laid off with long, narrow plows (bull-tongues), and two furrows are thrown on this with a turning plow, making a straight ridge, elevated 3 or 4 inches above the general level. The tops of these ridges are slightly flattened with a common hoe and the plants are set on the ridges from 20 to 24 inches apart for fine tobacco. In growing heavier tobacco, or tobacco of any kind on new land, the land is laid off 3 feet each way, or 3½ by 3 feet, or on very rich soils 3½ by 3½ feet, and small hills are made at the points of intersection. This is always done when it is desired to apply manure to the hill, it being placed in the depressions made at the intersectional points and the hills made above them. If

showers should happily come after the hills or ridges are prepared the plants are set out rapidly, but in seasons of drought a gill of water is applied to each hill in new land before planting. On old lands a pint of water is required for each hill to insure the life of the plant. As soon as the plants are firmly established, a common hoe is used to loosen the soil around them, which gives them an early start. The field is then plowed as often as may be necessary to keep down the weeds and to keep the land in good tilth.

From ten to sixteen leaves are left to each plant in topping, and the suckers are removed as fast as they attain a length of 2 or 3 inches. From four to seven weeks intervene between topping and harvesting, the period for the latter being the last of August, and continuing until the last of September, and even into October, when the transplanting has been delayed, or when unfavorable weather has checked the growth of the plants. In cutting a common knife is used. The stalk is sometimes split, but oftener speared on a smooth stick 4 feet long, from six to twelve plants to the stick. The time preferred for cutting is late in the afternoon, when the tobacco will not "sunburn". It is hung and hauled in in the morning while cool, in which condition it does not bruise so easily by handling. If possible, tobacco is never harvested immediately after a rain. When rains are continued, it is difficult to cure the crop to bright colors, nor does it ever recover its oily smoothness of leaf, but becomes harsh and impaired in quality.

CURING OF TOBACCO.

Two-thirds of the whole product of Burley tobacco is air-cured in open barns, one-sixth by charcoal, and one-sixth by flues and open wood fires, and it is usually allowed to remain on scaffolds, constructed in the fields, for three or four days before being put into these barns. Flue and charcoal curing are elaborated in the chapter on North Carolina, and are the modes used for making yellow wrapper.

After being well cured, the tobacco is carefully assorted as to length, color, richness, and defective leaves, tied mostly in hands of eight leaves, hung up on sticks for "ordering", or temporarily bulked.

There are three or four grades made in every crop, consisting of wrappers, bright and half bright fillers, and lugs or smokers, for bright tobacco; leaf, lugs, and trash, for the Burley sorts; and good leaf, low leaf, and lugs, for the heavy shipping tobacco. Unusual pains are taken, especially in Benton county, in properly assorting the crop. A really excellent article of tobacco, slovenly or unskillfully handled, will bring a very small price.

The insects and the diseases which attack the plant are the same as in other tobacco-growing sections. The bud-worm or wire-worm is probably more troublesome than any other insect.

TOBACCO-HOUSES.

These houses are constructed of logs, and are from 16 to 20 feet square, and from four to six tiers in height. Many of these log barns are furnished with flues, at a cost of from \$5 to \$30. Larger frame barns, 50 feet or more in length and 40 feet in breadth, are also built for air-curing, but these large structures are not deemed so efficient in the curing of yellow tobacco, it being much more difficult to secure a uniformity of temperature in them. The smaller barns will hold about 400 sticks of tobacco, equivalent, on an average, to the product of one acre; the larger barns, for air-curing, have often a capacity for housing 6,000 sticks, the product of from 14 to 16 acres. For flue or charcoal curing the barns are made very tight, but are open for air-curing. The cost of these structures ranges from \$50 to \$400. About 1 in 800 is annually destroyed by fire.

MARKETING OF TOBACCO.

By far the largest proportion of the crop is sold loose to local dealers, agents, or manufacturers, and is delivered to them in good pricing or bulking order; that is to say, when the tobacco is soft enough to handle without breaking the leaf but with the stem dry enough to crack two-thirds of its length when bent. Dealers pack in hogsheads 44 inches in the head and 58 inches in height, which cost \$2 each. The number of pounds of each type or grade of tobacco packed in a hogshead of this size is: of fine wrappers, 900 pounds; of manufacturing leaf, fine, 1,000 pounds; common manufacturing leaf, 1,200 to 1,500 pounds; lugs, from 1,500 to 2,000 pounds.

The time for delivering to dealers is during the fall and winter months, and even up to April, when the weather has been unsuitable for handling tobacco previously. When kept late, it is frequently injured in the open barns by mold, which is always present to some extent in warm, wet weather. Dealers prefer to prize in March, April, and May, before the period arrives for the tobacco to go into the sweating process. It generally reaches the market in Saint Louis in May, June, and July.

PRICES OF TOBACCO.

The average price received by the farmers for tobacco tied in bundles and not prized is 4½ cents per pound. Bright and half-bright wrappers bring an average of 12½ cents, ranging from 8 to 40 cents, a very small proportion bringing the higher figures. For White Burley the average price is 6 to 8 cents; manufacturing, 5 cents; common, 3½ cents; lugs averaging 1½ cent. The general average is reached by calculating the proportion of the crop of the district as one-twentieth bright wrappers, one-tenth White Burley, one-fourth manufacturing, two-fifths common, and one-fifth lugs. It costs 2 cents per pound to handle and pay all expenses on the tobacco after it leaves the planter's hands until it is sold in Saint Louis. There are no stemmeries in the district, but there are a few establishments where plug is made.

COST OF RAISING THE TOBACCO CROP.

Good tobacco lands are worth from \$10 to \$25 per acre; inferior from \$1 to \$5. When money rent is paid, \$5 per acre is the customary price. This probably includes the use of barns for housing the crop. Labor is cheap, and good men, well skilled in the growing and handling of the crop, can be hired the year round at \$150, inferior hands at \$100, and by the day, in summer, 75 cents is paid for the best hands. Wages, however, are not advanced in proportion to skill in the laborer. The following detailed estimate of cost on best soils was made for Benton county by Mr. William Smith:

Dr.		
To cost of making seed-bed.....	\$1 50	
Rent of land (interest on price).....	2 50	
Cost of preparing one acre for plants.....	3 50	
Drawing and setting plants.....	1 50	
Cultivating, harvesting, and preparing for market.....	33 00	
Delivering crop to market.....	1 50	
Total cost.....	43 50	
Cr.		
By 1,600 pounds tobacco, at 4½ cents (best lands).....	69 33	
Profit per acre, \$25 83; cost of production per pound, 2.7 cents.		

Good crops of White Burley averaged at the same time 8 cents per pound, making a profit per acre of \$84 50. A yield of 500 or 600 pounds per acre is often more profitable than a yield of 1,600 pounds; for 600 pounds at 12 cents, or 500 pounds at 15 cents, the average price of the fine yellow wrappers grown on thin soil, will aggregate a larger amount than 1,600 pounds at 4½ cents. The tendency among all planters of the district is to abandon the growth of the heavy, low-priced styles of tobacco and to substitute the finer and more salable types.

Tobacco is also raised by "croppers", the landlord furnishing only land, barns, and sticks, receiving therefor one-third of the crop, divided while green on the sticks at the time of cutting. One hand is allowed from two to three acres.

Charcoal, for curing, is worth 5 cents per bushel, delivered at the barn. One hundred bushels are required to cure 450 to 500 sticks of fine tobacco, an average of ten plants to the stick, or the product of one acre. Fewer plants are put to the acre and fewer on a stick for heavy, coarse tobacco, which is for the most part air-cured or cured by open wood fires. White Burley is also air-cured.

Wooden prizes cost from \$5 to \$12; screw and lever, \$11; screw and ratchet, \$14.

There are no warehouses for the inspection and sale of tobacco in the district.

OTHER DISTRICTS.

Some experiments have been made in central Arkansas, near Little Rock, within the past year, with Havana tobacco, which were very satisfactory, the product having the rich, mellow, aromatic flavor of the Cuba-grown leaf, and the cigars made from it being highly esteemed.

Every county in the state raises more or less tobacco, but principally in small patches for domestic consumption. A section of country embraced in Clay, Greene, Crawford, and Poinsett counties is occupied by Crowley's ridge, a considerable elevation, distinguished for its remarkable fertility. The subsoil of this ridge is a clayey bed, which underlies the quaternary marls and sands of the Saint Francis bottoms. Analyses develop the fact that the subsoil of this ridge contains more phosphoric acid, potash, soda, oxide of iron, and magnesia than the top virgin soil, and that fields long cultivated, though containing less potash, phosphoric acid, and soda than the subsoil, have a larger proportion than the virgin soils of other districts. The timber growth is black oak, hickory, black and white walnut, and tulip tree. Tobacco is planted on the slopes of this ridge, and the quality has been highly commended for domestic fillers and wrappers. From this point the product goes to Paducah or to Louisville, Kentucky.

Another region is beginning to produce tobacco in a small way for market, principally on the southwestern side of White river, and embracing a part of Van Buren, Stone, Searcy, and Newton counties. It may be considered an extension of the Benton County district.

The following statement shows the production, acreage, yield per acre, and value of the tobacco crops of Arkansas for 1876, 1877, 1878, and 1879. Only the figures for 1879 are from census returns:

Year.	Production.	Acreage.	Yield per acre.	Value in primary markets.	Average value per pound.
	<i>Pounds.</i>		<i>Pounds.</i>		<i>Cents.</i>
1876...	956,800	2,080	460.00	\$62,192	6.50
1877...	1,045,950	2,202	475.00	49,682	4.75
1878...	916,320	1,902	480.00	36,652	4.00
1879...	970,220	2,064	470.07	41,547	4.28

The crop of 1877 was the largest that has been produced for years, but it was of inferior quality, being coarse and bony. The crop of 1879 was not so good, however, as that of 1878, being affected by dry weather; but in 1876 it was about of the same character as the crop of 1879, with a fair proportion of yellow wrappers and smokers.

Nothing can be more deceptive, without proper explanation, than the table given above. The amount of tobacco grown in the state for market is very small, and the comparatively large amount produced for home consumption reduces the average very low. Benton, which sends more tobacco to market than all the other counties together, reports an average yield per acre of 724 pounds—a third greater yield than is reported for the whole state, and equal to that reported in some of the best tobacco districts in the South. Bradley county reports a yield of less than 100 pounds to the acre, and many others report between 300 and 400 pounds per acre.

CHAPTER IV.

CULTURE AND CURING OF TOBACCO IN FLORIDA.

The quantity of tobacco grown in Florida would not of itself justify an extended notice of the state as a tobacco-growing region. The article produced, however, more nearly than any other grown in the United States, resembles that produced in Cuba. No other portion of the United States so nearly resembles Cuba in the character of its flora, the equableness of its temperature, or the variety of its marketable productions.

CLIMATE.

In the latitude of Jacksonville, 30° 15' north, recent observations by the signal officer of the United States give a yearly mean average of 69.6 degrees, and the yearly range of the thermometer, as made up from the daily mean, to be 30.7 degrees. The rainfall for ten years averages 48 inches.

PROGRESS OF TOBACCO CULTURE.

Tobacco was first cultivated for market in Florida in 1829, in Gadsden county. A Virginia gentleman made it profitable on account of the silky texture of the leaf and the large amount that could be produced to the acre. The census of 1840 showed a total production for the state of 75,274 pounds, of which Gadsden county produced 66,324 pounds. In the census of 1850 the state reported 998,614 pounds, and of this Gadsden county was credited with 776,170 pounds and Marion county with 109,000. During the decade between 1840 and 1850 its culture extended into Calhoun, Leon, and Jefferson counties, adjoining Gadsden, and into Marion, near the center of the peninsula.

Between 1850 and 1860 the highest point of production was reached, and for several years the annual sales varied from 3,000 to 4,000 boxes of 400 pounds each. In 1860, owing to the increasing efforts made to raise sugar, and to the high price of sea-island cotton, (to the production of which the earnest attention of the planters had been directed), the reported production of tobacco declined to 828,815 pounds for the state, of which Gadsden county raised 553,701 pounds; Washington, 36,680; Calhoun, 119,800; and Liberty, 34,900. Jefferson and Marion had abandoned its culture. The total production reported in 1870 was 157,405 pounds, and nearly every county, except Gadsden, ceased to raise tobacco for market. In that year Gadsden county produced 118,799 pounds; Calhoun, 13,822 pounds; and Washington, 7,590 pounds. A few other counties reported a small quantity, the largest being Jackson, producing 4,202 pounds—scarcely enough for home consumption. The product in 1870 was only 19 per cent. of the amount produced in 1860. The enumerators' returns for 1880 show the production to have fallen to 21,182 pounds, grown on 90 acres, with an average yield per acre of 235 pounds, the lowest yield reported for any state or territory, except Maine and New Mexico. The crop of 1879 amounts to but 14 per cent. of that of 1860.

This decrease in production has been attributed to a multiplicity of causes, among them the want of confidence in the constancy of the labor in the state, tobacco requiring the most assiduous attention from the time it is planted until it is harvested. The petty thieving which prevails among certain classes in the tobacco-growing region had a depressing effect also. Hundreds of pounds were often carried off from the open sheds in a single night. Moreover, the hummock lands in the center of the tobacco-growing area have been very generally opened, and experience has demonstrated that in Florida the soils which produce the highest-priced seed-leaf tobacco must be fresh. When grown upon soils long opened it is thick and leathery.

The gray and mulatto hummock lands, slightly rolling and freshly cleared, are preferred for tobacco. If planted upon lands having a putty-like subsoil, the plants will grow well until the tap-roots come in contact with the impervious clay beneath, when they wither and scald if the sun should be hot. This is especially the case during a rainy season. This bluish clay is highly retentive of moisture, and an excess of water in either the soil or the subsoil is fatal to the tobacco plant. This subsoil has precisely the same effect upon the orange trees, the foliage of which becomes yellow when an orchard is established on such soils.

The red subsoil is very arenaceous, and is inclined to be porous, sufficiently, at least, to allow the superfluous water to percolate through it. A few hummocks have a sandy subsoil. These are very warm, and when planted in tobacco produce a quick growth. The leaves of the plants upon such soils become covered with white specks, locally called "turkey-egged". At one time tobacco so specked was very much in demand, 1.12 rix dollars per pound having been paid for it by the Germans. The fashion having changed for this peculiar style of tobacco, such soils are no longer desired for its culture.

About two-fifths of Gadsden county are pine lands, almost perfectly level. These lands have a grayish soil, with a salmon-red clay foundation. At the depth of 20 feet a bed of yellow sand occurs, and still lower a white sand, with a soft, whitish limestone rock, which hardens by exposure to the air. The soil of the pine lands is thin, varying from three to five inches in thickness, but will grow a good quality of tobacco when fertilized with cotton-seed, the quantity applied being about a pint to each hill of tobacco. The tobacco is equal in quality to any grown on the hummock lands, and many farmers prefer the pine lands for its growth. The droppings of cattle on the sandy pine lands enrich the land, while their tramping gives a degree of compactness to the soil which is highly beneficial. While some of these lands are very sandy, the soil of others is argillaceous, cold, and compact. Tramping the latter is attended with bad results. The chief difference between the pine and the hummock lands in the raising of tobacco is that the latter will grow it without fertilization and the former will not.

While the quantity of tobacco grown in Florida has been gradually decreasing for several years, the increasing demand for cigar leaf at Jacksonville and at Key West induced, as is reported, a larger planting for 1880 than for many years past.

VARIETIES OF TOBACCO GROWN.

Several varieties of tobacco are cultivated in Florida: the Florida Leaf, the Connecticut Seed-Leaf, the Havana, and the Virginia. The seed of the Florida Leaf was originally introduced from Virginia, and, while it has retained the size of the Virginia tobacco, it has, through a succession of years, acquired a silkiness and elasticity from the soil and climate which make it very valuable for wrapping purposes.

The Connecticut Seed-Leaf was introduced a few years since. It has a much broader leaf than the Florida variety, will grow a larger number of pounds per acre, and is more easily cured a chestnut color, the color most sought after at the present time by the manufacturer. Nor is it liable in as great degree as the Florida Leaf to the white speck, which is now considered a defect in the Florida variety.

The Havana is small, but commands a higher price. More plants may be grown to the acre, and two or even three crops may be grown in a single year upon the same land by leaving a sucker on the stalk near the ground in succession as the various crops mature. Another reason for its popularity is that it can be grown on old manured lands, while the other varieties are confined almost exclusively to the freshly-cleared areas.

The Florida Leaf and the Connecticut Seed-Leaf are grown for wrappers mainly, though the worst leaves are taken for fillers for common cigars. The Florida Leaf, though not so large as the Connecticut Seed-Leaf, has a better body and more gum. The Cuba tobacco is grown for both fillers and wrappers, and is said to preserve to a considerable extent the aroma of the Cuba-grown tobacco, becoming, however, larger and longer, until it assimilates the Florida Leaf. It is thought, however, that the deterioration, if it may be called such, will not occur in regions further south.

Many years ago a variety called the Spanish was extensively grown. It is reported to have had great silkiness and elasticity as a wrapper.

The Virginia is only grown for home consumption.

Tobacco planted upon sandy soils or gray hummock has less weight and a lighter color than when planted upon rich, loamy soil or manured lots, where it will grow heavier, coarser, and darker. A great deal depends upon the time at which it is planted.

The cultivation and curing of the crop is done very much as in eastern Ohio, from eighteen to twenty-four leaves being left on each plant when topped, the latter number for the Cuban varieties. In three or four weeks the lower leaves begin to turn from a dark to a light yellowish green. When in this condition three or four of the under leaves are plucked from the stalk and carried to the curing-house. The gatherings from this time on until all the leaves are stripped from the stalk occur at intervals of three or four days. Men, women, and children all find active employment during the harvesting season. A wagon is taken to the field, and those who are to pluck the leaves from the stalk wait until the dew is off, and then with both hands strip off the ripe leaves, laying them straight, a dozen or more in a pile. Others follow and take up the piles, either in their arms or in large square baskets, and carry them to the wagon, placing them regularly in the wagon bed. The leaves are then immediately conveyed to the barn or drying shed. Here they are taken out and placed on a platform elevated 2 or 3 feet above the ground. They are then taken one by one and an incision is made near the butt of the midrib long enough for a stick three-fourths of an inch square to pass through readily. The instrument used for making the incision is a hawk-bill knife, or a piece of tin made in the same form, attached to a handle. The sticks are made 4 feet 2 inches long, and thirty leaves are put upon each stick, care being taken in stringing the leaves to put them "back to back and face to face". In other words, the leaves must not be put upon the sticks so that they will conform one to

another, for if so placed when the desiccating process begins they will enfold each other, exclude the air, and become damaged or ruined by pole-sweat or "house-burn". The sticks are next elevated upon the tiers or racks in the barn and placed 6 inches apart. Tobacco is sometimes hung on a scaffold in the open field until it wilts, and is then taken into the barns, which are sometimes made dark, under the impression that too much light in curing is injurious, though it is always necessary that the tobacco have plenty of air in such cases during the night. In very damp weather, in the warm climate of Florida, tobacco will mold very quickly, and sometimes it is necessary to build small fires on the dirt floors of the barns to prevent this. For these fires charcoal is preferred. Any considerable amount of smoke, however, will greatly injure the flavor. A large stove, with a flue discharging the smoke outside, will dry the tobacco and prevent injury by mold or by smoke. There should be more or less moisture in the barn until the main stem of the leaf is of a nut-brown color.

The barns in Florida are built usually of round, rough pine poles. A house 30 feet square and 15 feet high is deemed sufficient to house two acres, there being seven rows of stalls, made of poles, elevated one above the other, to the roof of the building. The total cost of a barn of this size will not exceed \$30. In about five days the leaves from two or more sticks are put upon one, and room is made in this way for another gathering.

The tobacco is first assorted when the green leaves are split, all the perfect long leaves being put in one class, the worm-eaten and ragged into another, and the short leaves into a third. The tobacco is again assorted after curing, the same classification being made, with a due regard to color and texture of the leaves. From eighteen to twenty-five leaves are put in a bundle, each bundle being wrapped near the head with an inferior leaf, which is tucked between the others. Should the tobacco be in a state of proper humidity to keep well, it is immediately bulked down; but if the condition is too high, it is again put on sticks in bundles, the bundles being straddled over the sticks, ten or fifteen to the stick, and again elevated on the tiers, until favorable weather shall bring it to proper condition. If after tying up the leaves in bundles the planter has his boxes prepared, the tobacco is often packed directly in them, the heads being placed against the inside ends of the box, with the tails lapping in the center. Loosely packed in the boxes, the tobacco is pressed down with a lever, and an additional quantity is packed in, until the amount in each box is 400 pounds. These boxes are 32 inches deep, 2½ feet wide, and 3½ feet long. The packing usually takes place between the first of October and the last of December. Careful handling and curing makes a difference of from 10 to 20 per cent. in the selling price. Cuba tobacco ranges in price from 20 to 50 cents per pound, depending upon the care and skill exercised in curing and sweating.

The diseases of the tobacco plant in Florida are rare when planted on soils well drained. Hostile insects and worms multiply with amazing fecundity in that warm climate. They resemble those found in other localities.

COST OF RAISING TOBACCO.

The estimated cost and profit of raising tobacco in Florida on best soils are as follows:

Dr.		
Rent of 2 acres of land		\$10
One hand for five months.....		40
Board of same, at \$10 per month.....		50
Use of horse and utensils.....		18
Use of barn and sticks		3
Boxes for packing		6
Marketing.....		3
		<hr/> 130 <hr/>
Cr.		
By 1,600 pounds of tobacco, at 15 cents		240
Profit on 2 acres		110
Cost of production, \$8 12½ per hundred pounds.		

This is a full estimate of the cost of production, some farmers making it as low as \$7 50 per hundred pounds. The same laborer can make by moderate work three bales of cotton, 500 pounds each (1,500 pounds), 75 bushels of corn, and 50 bushels of sweet potatoes, which, at the prevailing prices, would bring in the market \$250; but as it will require to produce these commodities the work of the laborer for twelve months the growing of tobacco would seem to be much more remunerative. On the best tobacco soils the same quantity of Cuba tobacco may be grown with the same expenditure of labor that will sell in the market for 25 cents a pound, making the profit \$270. This increased profit on the growing of the Cuban variety has caused planters to abandon the seed-leaf to a great extent. The Cuba tobacco does not go through "the sweat" so well as the seed-leaf varieties. The burning qualities, too, in the Cuba, which is used more largely for fillers than for wrappers, is quite important. This quality is said to be more largely developed by the application of cotton-seed to the soil.

Mr. G. W. Floyd states that he has raised at the rate of 1,200 pounds of Florida Leaf to the acre on pine land tramped by cattle. He sold it for 12½ cents per pound.

Angus Nicholson raised in 1866 three crops of Cuba tobacco by turning out suckers, and made 400 pounds on a quarter of an acre. This was grown on a sandy ridge, fertilized with cotton-seed, and he was offered 75 cents

a pound for it. On hummock lands the same gentleman grew 1,800 pounds of Florida Leaf to the acre. The tobacco attained a height of 8 feet, and had from sixty to seventy leaves to the plant. The land was heavily manured with cotton-seed, deep furrows having been run and filled with the seed, and then covered with two more furrows. This crop brought in the market 18½ cents per pound.

Thomas M. Smith, of Decatur county, Georgia, raised a crop of 10 acres of Florida Leaf, which made an average yield of 1,500 pounds to the acre, and was sold for 15 cents per pound. This crop was grown on red, stiff, hummock land, without the application of any fertilizer.

The prices paid for the crops grown have also greatly animated the tobacco-growers. They have ranged about as follows: Florida and Connecticut fillers, 5 cents; binders, 8 cents; wrappers, 16 cents; price around, 14 cents; Cuba tobacco fillers and binders, 15 cents; wrappers, 25 to 30 cents; average for wrappers, 20 to 25 cents. A few cases of extra fine tobacco brought prices far in excess of any mentioned here.

The relative proportion of fillers, binders, and wrappers is variable, and depends upon the degree of skill and care exercised in growing, curing, and sweating. In the best crops of seed-leaf there are about two-thirds wrappers and one-third binders and fillers.

The crop in Florida is very irregular in quantity. In 1873 it was 80,000 pounds; in 1874, 160,000 pounds; in 1875, 320,000 pounds. Since that time it has been constantly decreasing, the small amount produced being taken by cigar manufacturers in Jacksonville. The average crop since 1876 has not exceeded 30,000 pounds, so small a quantity as to be lost sight of in the volume of trade.

CHAPTER V.

CULTURE AND CURING OF TOBACCO IN ILLINOIS.

The state of Illinois has less variety in topography than almost any other state of the Union. The surface features are generally gently-rolling prairies, whose greatest elevations rarely exceed 700 feet above the sea level. This is increased in the northern part of the state and decreased in the southern portion. The feature of the central region is that of a great level, the slopes being of very slight grade. In the southern and western portions of the state the surface is rugged over small areas, and there are some bluff-like peaks.

Tobacco has been cultivated to some extent in Illinois since its first settlement, though up to 1864 its culture was confined, for the most part, to the more southerly counties. The census of 1840 reports the whole number of pounds produced at 564,326, the following counties only reporting a production in excess of 50,000 pounds, viz: Gallatin, 63,190; Wayne, 60,110; White, 68,061; Williamson, 115,419. The succeeding census shows that the production of this staple did not keep pace with the increase of population, for while the latter increased during the decade between 1840 and 1850 nearly 80 per cent., the tobacco product increased only 48 per cent. The number of pounds reported in 1850 was 841,394, only two counties reporting over 50,000 pounds, Saline and Williamson, the latter producing over five-eighths of the whole. The census of 1860 returned 6,885,262 pounds; an increase, as compared with 1850, of 718 per cent. The counties at that period producing over 50,000 pounds were Crawford, Franklin, Gallatin, Hamilton, Jasper, Jefferson, Johnson, Pope, Saline, Wayne, White, and Williamson, the last named county still taking the lead, producing over 1,700,000 pounds, Johnson and Saline coming next, each producing over 1,000,000 pounds.

Previous to 1860 no tobacco as a staple crop had been cultivated in the northern tier of counties. The high prices, however, which prevailed in 1863 induced Mr. A. Simmons, a resident of Stephenson county, to make an experimental planting of the seed-leaf variety. It grew large and cured up an excellent color. He had the whole crop manufactured into cigars, and found a remunerative and ready market for them at home. His complete success stimulated his neighbors the succeeding year to plant a crop, and the cultivation gradually extended out to embrace the larger portion of Stephenson and Jo Daviess counties.

In 1870 the total production of Illinois was 5,249,274 pounds, a falling off, as compared with the census of 1860, of over 20 per cent. This was probably due to the occurrence of unfavorable season, and not to a reduced acreage. The following counties reported a production of over 50,000 pounds, viz: Edwards, Franklin, Gallatin, Hamilton, Jackson, Johnson, Jefferson, Massac, Pope, Pulaski, Saline, Stephenson, Wayne, White, and Williamson; Saline and Williamson being still in the lead, each producing a little over 1,150,000 pounds. Crawford and Jasper during this decade abandoned to a large extent the culture of the crop, while Edwards, Massac, Pulaski, and Stephenson were added to the list of tobacco-growing counties. The returns of the enumerators of the census of 1880 show a total production for the state of 3,935,825 pounds, the counties having under cultivation over 100 acres being Franklin, Hamilton, Johnson, Massac, Pope, Saline, Williamson, Jo Daviess, and Stephenson. Of the counties named Jo Daviess and Stephenson are in the extreme northwestern part of the state, the others in the southern part.

The rocky strata underlying the surface of all these southern counties belongs to the carboniferous formation, and consists of shales, sandstones, slates, and limestones; but the soil of this whole area is almost entirely composed of drift, some of which is derived from the same rocks as those underlying, brought from their location in more northern sections of the state. The topographical features of this region are varied, some sections having level and others rolling prairies. In the former the soil is very rich and of black color, while on the rolling and ridgy prairies the soil is usually a chocolate brown, but of equal fertility with the black soils. The timbered ridges have almost invariably a light chocolate-brown colored soil. The tree growth of the ridges is chiefly black and white oak and the various kinds of hickory. Where the tops of the ridges become plateaus, or coves are formed on their sides, the elm, black walnut, sugar maple, and wild cherry grow to great size. Johnson and Pope counties are broken with frequent ridges and bluffs, while to the south the country becomes gently rolling, and then so level that the streams drain off slowly, frequently overflowing large areas. The ridge land is fertile, especially on the plateau tops, and the tree growth is white and black oak and hickory. The soil is sandy and warm, and is easily cultivated. The soil in the southern part, though somewhat wet, is warmed up and the clays made loamy from the mixture of sands from the highlands of the north, and is of great fertility. The timber growth is white oak, sugar maple, walnut, hickory, elm, etc. Pulaski and Massac counties are almost identical in their geological formation and in the character of their soils. The northern townships have a surface covered by gently sloping hills, with an arenaceous, loamy soil that is very fertile. These hills are heavily timbered with white and black oak, hickory, poplar, black gum, walnut, and dogwood. In the southern part of these counties the soil is the rich alluvial river bottoms, with a growth of pecan, willow, sycamore, maple, cottonwood, ash, and elder. The central area is largely occupied by a section called the "oak barrens", the soil of which is a fine arenaceous loam of a yellow color and of great depth. The term "oak barrens" is derived from a peculiar variety of Spanish oak, of small size and rough and bushy appearance. It is the prevailing undergrowth, the larger trees being scattered, and consisting of post, white, and black oaks, hickories, and a few yellow poplars and elms. In the western portion of this area the large growth is more abundant, with frequent black and white walnut and sugar maple. The soil of these "oak barrens" is claimed to have great capabilities for production. The best soils of Saline county are those derived from drift. This drift is a yellowish, gravelly clay, and Saline county has a much larger proportion of it than the adjoining county of Gallatin. The poorest soil is that derived from the shales of the coal formation. The timber growth on the river bottoms is black walnut, white, red, and black oak, hickory, and poplar; that on the highlands chiefly hickory and the oaks. The soils of the county of Williamson resemble those of Saline, especially the western part of that county, though they are more varied. The prairies are small and scattered over all parts of the county. The post-oak flats are considered the poorest land, and the chocolate-colored clay loam, on which the prevalent tree growth is oak and hickory, with occasional walnut, linden, and wild cherry, is considered the best.

The characteristics of the soils, topography, and timber growth of all the counties in the southern division of the state are a parallel of those described. They may be thus summed up: Wherever a prairie has dark, chocolate-colored soil, it is fertile, and where there is a similar soil, with a timber growth of the heavy oaks, pignut or scaly-bark hickory, with more or less black walnut, large crops of corn or tobacco may be expected from it when cleared.

In the counties of Jo Daviess, Stephenson, and in part of Carroll the underlying rocks are the limestones of the Trenton group, with occasional hills of the Niagara. There are large areas entirely free from drift, and the quaternary sands and pebbles which do exist are derived from sources other than those of the more southern parts of the state. It has also been assumed that the rolling prairies of these counties have been made by a different cause from that producing those of the central part of the state. Unlike the latter, the surface of these northwestern prairies sometimes rises into high ridges, and then again they become low swamps. The soil is a loam, with a predominance of sand, and these prairies are noted for their excellence as grazing lands. The general slope of Jo Daviess county is to the southwest, and is excellently watered by numerous streams. The eastern part of the county is generally level prairie, with a rich, warm, deep soil; the central part uneven, and the timber scrubby. The western sections are well timbered, but hilly, and in many places there are prominent bluffs. The southern surface is varied, frequently rising into gravelly hills. The general color of the soil is reddish, and it is seldom considered fertile by those accustomed only to the rich, black prairie soils of the central region. Stephenson has the reputation of being one of the best agricultural counties in the state. The soil is very rich, and it has a darker chocolate color than that found in the southern counties. The oak openings are very rich, and produce large crops of wheat, and are the lands specially adapted to tobacco. The land of this county is almost all prairie, with occasional patches of timber, and it is well watered, but not so abundantly as Jo Daviess. The timber growth consists of the oaks, walnuts, and maples, and the prairies have a gently undulating surface.

CLIMATE.

The records of temperature and aqueous precipitation are very meager in the tobacco districts of this state. Observations made at Winnebago, in the county next east of Stephenson, from 1856 to 1867, showed the following average temperature for the different seasons of the year: Spring, 48 degrees; summer, 69.22; autumn, 47.48; winter, 20.67; average for the years included, 46.34. The rainfall for nine years, from January, 1857, to December, 1866, at the same point, for the seasons, was as follows: Spring, 9.72 inches; summer, 12.31; autumn, 9.66; winter, 6.14; average for years named, 37.83.

TOBACCO DISTRICTS.

Since the cultivation of the seed-leaf varieties has become general in some of the northern counties the trade has recognized two distinct tobacco districts in the state:

1. The seed-leaf district, comprising Stephenson, Jo Daviess, and a very small portion of Carroll county. The tobacco raised in these counties is packed in boxes, and is consumed, for the most part, in the United States.
2. The shipping district, embracing all those counties that lie in the southern part of the state in which tobacco, whether of the seed-leaf or of heavier varieties, is packed in casks instead of boxes.

THE SEED-LEAF DISTRICT.

This district is composed of high, rolling prairies, interspersed with "oak openings", with a soil derived for the most part from the drift formation. Local accumulations of a yellow clay are found, which generally form the more elevated portions of the district, and upon which a timber growth of elm, burr oak, basswood, maple, birch, pin oak, black-jack oak, shell-bark hickory, and wild cherry is found.

The increase in acreage was about 15 per cent. greater in 1879 than in 1878. The yield, though the same in Stephenson county, was somewhat increased in Jo Daviess in 1879, the crop being of a very superior quality.

The Connecticut and the Pennsylvania Seed-Leaf, and a variety known as Sweet-Scented, or Spanish, are planted throughout the district. The latter variety is doubtless the same as that known as Havana Seed, which is so extensively grown in New England. This seed was introduced into Illinois by the Agricultural Department, and it is becoming the most popular variety grown. It is only about two-thirds as large as the seed-leaf varieties, has a pea-green color, grows with upright leaves, and is preferred by farmers, because it has a better flavor, a finer texture, is more elastic, and brings a better price in market. The flavor resembles that of the Havana, but is not so decided. It occupies a position intermediate between the seed-leaf varieties and the Havana, both in size and in aroma, and is said to make a cigar mild and pleasant to the taste, neither so strong as the genuine Havana nor so insipid as the seed-leaf. The same variety of tobacco grown on the dark prairie soils is thought to have a better flavor and to cure up to a deeper color than if grown upon the clayey soils of the timbered lands. Upon the latter soils it is lighter in color, heavier in body, and approximates the heavier sorts used in the manufacture of plug chewing-tobacco. Successively grown on well fertilized prairie lands, tobacco improves in flavor, in elasticity, in texture, and in burning qualities. Land from which the water will gradually drain off, not level, but nearly so, is preferred, whether originally prairie or timbered land, but the soil must be dark in color, loose from an accumulation of humus or of arenaceous material, or, better, from a combination of the two. The timber growth which characterizes good soils for tobacco is pin oak, black-jack, hickory, and burr oak. Prairie land is, by a majority of planters, preferred to timbered lands. The gentle slopes bordering the streams, with a southern exposure, are generally selected, and are highly fertilized with stable manure—better a year old than fresh—forty or more loads per acre being applied for the first crop of tobacco; but afterward half that quantity will suffice to keep the land in good tilth and to increase its fertility. A load of manure is about half a cord. Tobacco succeeds tobacco year after year without any rotation, as the product so grown shows a constant improvement. Should there be an undue proportion of argillaceous matter in the soil, a crop of rye is found to be beneficial if turned under in the spring, but even the crop of rye does not break the continuity of the tobacco crop.

No attempt is now made to grow tobacco without fertilizing, for experience has demonstrated that when tobacco is grown, even upon virgin soils, without manure, the texture is coarse and the flavor poor. The yield per acre has been increased during the past ten years; the average now is 1,392 pounds per acre. The seed-leaf varieties run from 1,500 to 2,000 pounds, and the sweet-scented from 800 to 1,400 pounds per acre. The quality of the tobacco has greatly improved within the same period, due to increased care and skill in manuring. There is also a better knowledge of the soil, and there are better houses for curing the crop.

SEED-BEDS.

A deep, dark soil, having a southern exposure, is selected for a seed-bed, and the same place is used for a number of years. It is not burned, but spaded up, and a liberal quantity of fresh stable manure is worked into the soil. The sowing is done as early after the 1st of April as possible, and may be extended even into May; the transplanting is done from the 1st to the 25th of June.

In the preparation of the soil for the crop manure is applied in the spring, though the land always receives one plowing in the previous fall. A second plowing to the depth of 5 inches is given after the application of the manure, and afterward a third, with frequent harrowings, to keep the land well worked until the plants are ready to set, at which time rows are made $3\frac{1}{2}$ feet apart, and the plants are set in the rows—seed-leaf 24 inches, and sweet-scented, or Spanish, 20 inches apart. A few growers make hills in the rows for receiving the plants; others set out on the sides of the furrows. The first method is the neatest and the best should unfavorable weather set in after transplanting. In the cultivation of the crop a fine-toothed cultivator is first run between the rows; afterward a two-horse cultivator, provided with shields, which run under the leaves of the tobacco plant, is employed, the shovels to which throw a small quantity of dirt to the plant. The latter implement is employed

as often as the land may need stirring. In thirty or forty days the plants are topped to fourteen, eighteen, or twenty leaves, according to the vigor of each. No pruning is done. The crop is suckered twice, and cut immediately after the last suckering. It is then air-cured, and its management in all its details is almost identical with that given in the description of the adjacent Wisconsin district.

One method of killing the tobacco fly is practiced which is not mentioned in the schedules from any other district. A bed of petunias, a genus related to the tobacco plant, is sown near the tobacco-field, the sowing being so timed that the flowers, of which the moth is very fond, may be in bloom about the time the fly makes its appearance. At twilight these beds are visited, and as the moths hover over the flowers they are knocked down and killed with paddles. This is said to be the most effective method of destroying them.

The acreage and the amount produced in the district, yield and value, for four years are as follows, only the figures for 1879 being from census returns:

Year.	Production.	Acreage.	Yield per acre.	Value in primary markets.	Value per pound.	Value per acre.
	<i>Pounds.</i>		<i>Pounds.</i>		<i>Cents.</i>	
1876	840,000	570	1,473	\$67,200	8.00	\$117.80
1877	841,000	590	1,425	73,587	8.75	124.72
1878	822,000	654	1,258	79,461	9.66	121.50
1879	1,043,975	752	1,388	87,030	8.34	115.74

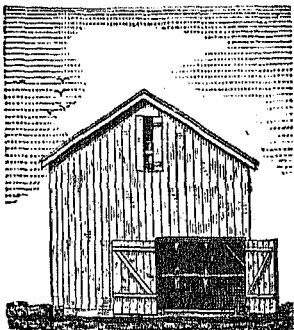
Farmers for the most part sell to local dealers, who reassort and pack in boxes 3½ feet long and 2½ feet deep and wide, containing 400 pounds to the box. These boxes are made of white pine, and cost \$1 each. The following table gives the range of prices received by farmers for different varieties, crop through, for four years to 1879:

Year.	Seed-leaf.	Sweet-scented.
	<i>Cents.</i>	<i>Cents.</i>
1879	6 to 8	11
1878	7½	12½
1877	6½	20
1876	8	None raised.

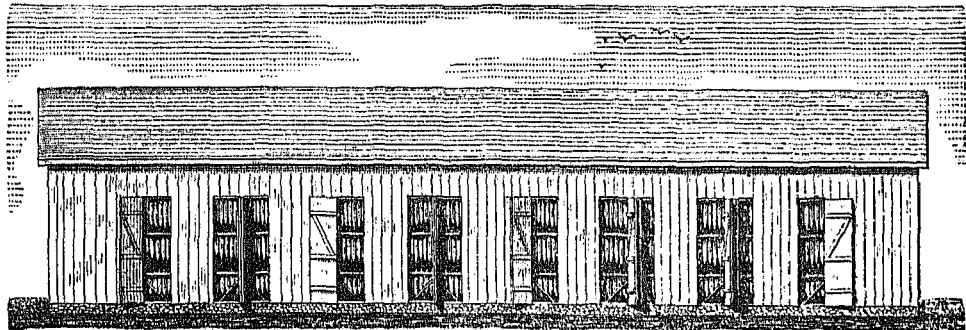
The farmer does not sell by grades, but in stripping three grades are made, viz, wrappers, binders, and fillers. Wrappers are worth about twice as much as binders, and the latter twice as much as fillers. The proportion of grades varies in different crops, according to soil and management. The best crops in a good season will run as high as 66 per cent. wrappers, the remainder being equally divided between fillers and binders. The average, however, is: wrappers, 50 per cent.; binders and fillers, each 25 per cent. The tobacco of this district is mainly consumed in the United States, though a small proportion of the lower grades is taken for export. It is understood that about one-third of the tobacco of the district is Sweet-Scented Spanish or Cuba Seed, as it is variously called, and the remainder seed-leaf. A part of the product is taken in the district by manufacturers, but by far the larger proportion is sent to New York, Chicago, Saint Louis, Cincinnati, and Baltimore.

TOBACCO-HOUSES.

Up to within a recent period the houses for curing the crop were very inferior. Rude structures, made oftentimes of rails, and covered with straw, were thought to be good enough, and even now there are many sheds with good frames having only a roofing of straw. The great losses suffered in consequence of this inadequate provision have induced the better class of farmers to erect good houses, in which the tobacco is not only protected from bad weather, but the farmer is enabled to have the tobacco under control during the curing process. A cut illustrating one of the best of these barns, belonging to A. Simmons, is here given.



End view—Entrance.



Side view.

A house of this kind, 28 feet wide and 108 feet long, having 18-foot posts, with four tiers beside the peak or roof tier, is considered ample for harvesting 6 acres of tobacco. In the "shed" represented there are ten bents, 12 feet apart. Each one of these bents has three posts. The upper three tiers are framed into these posts, but the ground tiers are let in by slots, so that they may be lifted out. This permits a wagon to be driven in, which is a great convenience in filling up the higher tiers. Such a shed as the one represented, with good shingle roof and side doors, may be built at a cost of about \$700.

A shed for 3 acres is constructed of posts 18 feet high, but its width is reduced to 24 feet, and its length to 60 feet. Many growers prefer small sheds, as it is thought the tobacco is less liable to pole-sweat.

White veins are of very common occurrence in the crop, and are due, it is thought, to the prevalence of drought while curing tobacco cut full ripe; at least it has been observed that they appear in greatest quantity under these conditions. White veins sometimes occur without any known cause, injuring the crop very much, but not so much as pole-sweat.

COST OF RAISING TOBACCO.

Lands capable of producing the best tobacco and yielding the largest number of pounds per acre readily sell at \$50 per acre. Such lands will yield 1,800 pounds of seed-leaf and 1,300 pounds of the sweet-scented varieties per acre. The wages of a good man are \$1 per day and board. Mr. A. Simmons, the oldest grower in the district, furnishes the subjoined estimate, applicable for the best lands. He estimates that a good man can cultivate and take care of 4 acres of tobacco by working five months in the year:

Dr.	
One man five months, at \$1 per day	\$130
Board of hand.....	40
Manure, 20 loads, at \$1 per load.....	20
Use of horse and plows.....	10
Feed of horse, two and one-half months.....	10
Rent of land, \$4 per acre.....	16
Use of sheds, lathes, wagon, etc.....	25
Hauling to market.....	5
	<hr/>
	256
	<hr/>
Cr.	
By 7,200 pounds tobacco, at 8 cents.....	576
Profit on each hand on best soils.....	320
Profit on each acre.....	80
Cost per pound to grow, 3½ cents.	

Taking the average yield of the district, the cost will be \$4 61 per 100 pounds.

Assuming the yield of the Spanish varieties to be 1,300 pounds per acre on best soils, 4 acres would produce 5,200 pounds, which, at 11 cents, would bring \$572, which is nearly the same amount as is realized from an equal acreage of seed-leaf. To the inquiry made as to the relative proportions of the two varieties planted, no definite answer was returned, but about one-third of the acreage is of the Spanish varieties. The difference between cultivating the two may be expressed by saying that the Spanish varieties are of readier sale, require less shed room, but are more likely to be injured in the sweating process. The seed-leaf varieties fluctuate in price less than the Spanish, can be grown with more certainty, yield more uniformly, and are preferred by farmers who have no speculative turn. It may be mentioned in this connection, however, that the Spanish varieties are growing every year in favor, and to this tendency is to be ascribed the change which is taking place among farmers in the selection of soils for the growth of tobacco. Twelve or fifteen years ago the best tobacco was grown upon the black, timbered lands, and the prairie soils were thought to grow inferior tobacco. It is now found that tobacco grown upon the black soils of southern slopes, on gently rolling prairie, has not only a larger leaf, but has also a better flavor.

SHIPPING-LEAF DISTRICT.

The counties belonging to this district are Franklin, Hamilton, Johnson, Massac, Pope, Saline, and Williamson, with smaller areas in Clay, Gallatin, Hardin, Jackson, Marion, Jefferson, Pulaski, Wayne, and White.

Much of the crop of 1879 in this district was injured by mold and by the disease known as "leprosy". The exceedingly low prices which have prevailed for several years for the tobacco grown in southern Illinois have had a very depressing effect upon the industry, and the crop has been greatly reduced.

The varieties planted consist of the Blue and Yellow Pryors, Tally, One-sucker, White Stem, and generally such as are grown in the heavy tobacco districts of Kentucky and Tennessee. Descriptions of these varieties may be found in the chapters on these two states.

The tobacco of southern Illinois is used for making strips for the English markets, for export to the continent and to Africa, for manufacturing into heavy plug for Mexican balers, for stogie fillers, and for manufacturing a rough smoking-tobacco; but for all these purposes it is considered inferior to the tobacco grown in Kentucky, and even in Indiana, Williamson county being an exception, in which the product is of considerable value. The tobacco is generally of good size, red or brownish in color, showy, porous, with a large stem and fiber. In Johnson, Massac, and Pope counties some rich, fat tobacco is produced on the limestone soils, and on the oak and hickory ridges a style of tobacco much resembling the light-colored leaf of the Owensboro' (Kentucky) district is made. It is estimated that 65 per cent., though classed as shipping leaf, may with more propriety be referred to the nondescript. It occupies a very low place in the market, due probably more to bad handling than to the want of adaptation in the soils for the production of a high grade. A large part of the product is grown on freshly-cleared lands, on which the original timber growth was hickory, oak, walnut, and poplar, but the soils preferred are light-colored rolling uplands, with a clayey, mulatto subsoil. On such lands the tobacco grows with a finer texture, and has a better color, though light, having but little body. On bottom lands, and on old lands well manured, a dark-red, spongy leaf is produced, heavy, but not fatty, which, though well adapted to the manufacture of strips, is unsuited for domestic manufacture. Old lands, when planted in tobacco, are generally treated with stable manure, at a cost varying from \$1 50 to \$5 per acre.

The preparation of seed-beds and the cultivation of the crop are copied after the methods pursued in the heavy tobacco districts of Kentucky, but much less care is taken with the crop. About two-thirds of the tobacco, after it is cut, is simply hung up in open barns, after being previously exposed to the sun on scaffolds, and no further attention is given to curing it. It is afterward taken down, assorted, stripped, and packed in a rough way in hogsheads, which are made to weigh from 1,400 to 1,800 pounds for leaf and lugs. Some fire the tobacco with logs, and here and there a few farmers have constructed barns with flues for curing. Such farmers make a moderate profit on the crop, but it is a question of great doubt whether one farmer in ten growing tobacco in southern Illinois makes it profitable. The average price received by the farmer is: for leaf, \$3 75 to \$5; lugs, \$1 50 to \$2.

As estimated, the cost of production varies from \$2 50 to \$4 per hundred pounds, and the yield per acre for the different counties growing over 100 acres averages 619 pounds. Saline county shows the largest production, and also the largest average yield per acre in 1879, and Williamson stands next. The quality of tobacco grown in this latter county is much better than that raised in any other county in southern Illinois, and is better than the best raised in Indiana; but all other southern Illinois tobacco is considered inferior.

Hogsheads cost from \$1 75 to \$2. A large portion of the crop, probably three-fourths, is sold to local dealers, who pay so much per pound through, receive it in redrying houses, and pack it for market.

Strips are put up at Galatia and Raleigh, in Saline county, and also at Equality, in Gallatin county. At these points 75,000 pounds of strips were put up in 1879.

TOBACCO PRODUCTION.

The following statement shows the amount of production, acreage, yield per acre, and value of the product in the primary markets of all the tobacco areas in the state of Illinois not embraced in the seed-leaf district for the years indicated. The figures for all the years are estimated except those for 1879, which are made up from the census returns:

Year.	Production.	Acreage.	Yield per acre.	Value in primary markets.	Value per pound.	Value per acre.
	<i>Pounds.</i>		<i>Pounds.</i>		<i>Cents.</i>	
1876.....	10,734,800	17,743	605	\$420,392	4	\$24 20
1877.....	7,032,400	11,435	615	210,072	3	18 45
1878.....	3,447,470	5,651	610	108,424	3	18 30
1879.....	2,891,850	4,860	595	115,625	4	23 79

The following statement shows the total amount of production for the state of Illinois, yield, value of product in primary markets, value per pound, and value per acre for the years indicated. The yield of each year, except the last, which is from census returns, is estimated:

Year.	Production.	Acreage.	Yield per acre.	Value in primary markets.	Value per pound.	Value per acre.
	<i>Pounds.</i>		<i>Pounds.</i>		<i>Cents.</i>	
1876.....	11,574,800	18,813	632	\$496,392	4.29	\$27 11
1877.....	7,873,400	12,025	655	284,539	3.61	23 06
1878.....	4,270,370	6,305	677	182,885	4.28	29 00
1879.....	3,935,825	5,612	701	202,661	5.15	36 11

All reports agree that, while the tobacco area is very rapidly diminishing in southern Illinois, it is gradually increasing in the northern part of the state, where the seed-leaf and Spanish varieties are cultivated.

CHAPTER VI.

CULTURE AND CURING OF TOBACCO IN INDIANA.

The counties in Indiana growing the largest quantities of tobacco for market are Brown, Dubois, Gibson, Greene, Perry, Pike, Spencer, Warrick, and Wayne. Of the total product of the state in 1879, over 85 per cent. was grown in the counties of Dubois, Gibson, Perry, Pike, Spencer, and Warrick. This block of counties lies in the southwestern part of the state, between the Ohio river on the south and White river on the north, being adjacent to the Lower Green River district of Kentucky.

GEOLOGICAL AND PHYSICAL FEATURES.

Excluding the ash-colored alluvial bottoms, which are formed of the fine silty deposits gathered by the streams from the highly-comminuted material of the drift and clay, this block of counties belongs to the carboniferous formation. Along the Ohio river the lands in the eastern part of the district are broken into hills more or less abrupt, which rise to an equal height with the great interior plateau which forms by far the largest part of the surface of the state. These elevations sometimes form long, winding ridges, which constitute the watersheds of the numerous tributaries of the Ohio river. The lowlands on the streams sometimes spread out to a great width, rising gradually for the most part by easy slopes to the summits of the ridges, and these ridges are frequently almost severed by the beds of smaller streams, making a succession of knobby hills. At other places the crests of the ridges are broad enough to give a wide expanse of gently-rolling land, and these continue to widen as the distance from the larger streams is increased, forming large plateaus by uniting one with another as the heads of the smaller streams are passed. In the western part of the district the surface is more level, there being but few high hills.

In Dubois county one-tenth is estimated to be creek and river bottoms, one-half modified drift and alluvium of ancient lakes and rivers, and the remainder bold hills and ridges and elevated plateaus, made up of the conglomerate sandstones and slates of the coal measures. The eastern part of the county is very rugged, but in the southern and western parts plateau lands are of frequent occurrence, sometimes level, but generally rolling. Some of the best soils in the county are derived from the loess, which generally forms a sandy loam of brown color. Many of the highest plateaus and hills are capped by this soil, which supplies a tree growth of walnut, sugar maple, wild cherry, and papaw. These plateaus are usually called "walnut levels", which are noted for the excellence of the crops grown upon them. The soil of many of the creek and river bottoms is very wet in winter, and bakes to great dryness in summer. It has an ashen color, is very fine-grained or powdery, though pebbles and broken shaly material often occur, imbedded in the finer silty deposits. The usual timber growth is elm, red maple, and gum, and where there is a considerable proportion of sand and gravel beech, sugar maple, overcup oak, and the tulip tree are found.

The surface in the western part of Gibson county is generally level or gracefully undulating. About one-half of this portion of the county is bottom land, lying on the Wabash and the White rivers. Some sandy barrens also occur. Elevated plateaus are characteristic of the eastern and northeastern boundaries. These are often pierced by deep valleys. The soils of this county are fairly typical of the soils of the principal tobacco-growing area of the state, and may be divided into four groups:

1. River bottoms, made up of sands and clays spread out by overflows, generally fine silt or impalpable sands, but often gravelly or slaty. This soil is formed by a commingling of materials derived from the various beds through which the streams pass with a large amount of vegetable matter. Where there is not an excess of argillaceous matter the soil is warm and rich, but local beds of "crawfishy" soil occur, as well as beds of sand.
2. Second bottoms. This soil generally rests against the terrace beds or ancient alluviums, which may be recognized by the beds of sand and gravel, reaching to a considerable height. The texture of this soil is much coarser than that of the river bottoms.
3. Coming next is the loess, consisting of ashy-gray siliceous clays, often containing minute shells. When undisturbed it has a buff color, but under culture it rapidly assumes the gray ashen color mentioned, and becomes compact in structure.
4. The bowlder drift next succeeds. This is a heavy bed of blue and gray clays, very tenacious, and containing a large amount of pebbles and bowlders foreign to the region.

The yellowish loam which rests upon the ridge coming in from Pike county constitutes a broad belt of very fertile lands about Princeton and Owensville, and its characteristic timber is oak and poplar (tulip tree), maple, beech, hickory, ash, gum, etc.; in the river bottoms, walnut, sycamore, cottonwood, papaw, elm, and honey-loust.

Perry and Spencer have many more rugged hills than the counties described, and Perry, Spencer, and Warrick have the largest areas of good alluvial soils, the two latter counties producing five-eighths of all the tobacco grown in the state. Spencer grows the best tobacco, but Warrick makes the largest quantity.

In Pike county the bottom lands on Pataka river are of a great width, but the soil is whitish in color and cold, being completely saturated with water during the spring and winter months and parched by drought in summer. South of the Pataka the soils are reddish in color, and upon these tobacco is grown of a character resembling the heavy product of Kentucky.

Perry county, though very broken and uninviting for agricultural industry, has soils well adapted to the culture of tobacco, which is grown on the sandy loams of the river bottoms and upon the gentle slopes of the hills, where the reddish siliceous soils occur. The Saint Louis limestones crop out along the banks of the Ohio and in the valley over the greater part of the county east of Deer creek, and the coal-bearing strata mount up oftentimes in rugged hills to the height of from 200 to 400 feet. The soils derived from the weathering of the Saint Louis limestone and those from the weathered drift, or the limestones intercalated with the coal measures, are found to be best adapted to the growth of fine tobacco.

Brown and Greene counties lie farther north, and differ from those described in having more extensive drift and lacustrine deposits, which give character to the soil. The coal measures are wanting in Brown county, the underlying rocks belonging to the subcarboniferous, and the soils have a varied character. The drift appears in the northern part of the county, and gives rise to soils of much strength and durability. The alluvial soil, mainly derived from the aluminous shales and sandstones, is often sticky and cold, unless ameliorated or enriched by sands and calcareous clays from the glacial drift or limestone. On the bluffs flanking the streams are benches of ancient alluvium, containing pebbles of quartz. Lacustrine loess and silts are found in various parts of the county, making soils of fair fertility, and here and there are rich valleys, often partly surrounded by knobs from 200 to 300 feet high. Weed Patch knob rises to the height of 1,147 feet above the sea, and nearly 500 feet above Nashville, the county-seat. Tobacco is grown principally in the southeastern part of the county, though it is also grown to some extent in the central and northwestern portions.

Wayne county, in the eastern part of the state, has soils derived from the disintegration of the drift deposits. The kinds of tobacco grown are the seed-leaf varieties, including Havana seed.

METEOROLOGY.

The reports of the United States signal office cover only one point in the state—Indianapolis; yet, while its elevation above the sea is only 698 feet, the records at that point may be taken as a basis of calculation for the tobacco-growing regions of the southern and eastern portions of the state. The observations at Indianapolis were commenced February 10, 1871, and are given to October 31, 1880. Mean temperature: Spring, 52.2 degrees; summer, 75.1; autumn, 53.7; winter, 32.8; extreme range, 118; average range, 49.9; highest temperature, 97; lowest, 20 below zero; mean annual rainfall and melted snow, 45.22; prevailing winds, south. The following is condensed from observations extending from 1864 to 1873, at Vevay, 525 feet above the sea, 72 miles south of Indianapolis: The average mean of spring for the period included in the observations was 54.46 degrees; summer, 76.41; autumn, 55.38; winter, 32.48. The mean of the nine years' observations at Indianapolis was 53.4; that at Vevay, though not for the same years, was 54.68. The annual rainfall, including melted snow, for the period reported was: At Vevay, 52.77 inches, being for spring, 15.63; summer, 11.40; autumn, 15.12; winter, 10.62.

VARIETIES OF TOBACCO GROWN.

Numerous varieties of tobacco are produced in the state, chief among them being the Yellow and Blue Pryor, Orinoco, One-sucker, Lovelady, Connecticut Seed-Leaf, Kite-Foot, and White Burley. The first named are grown almost exclusively in Warrick, Spencer, Perry, Pike, Dubois, Gibson, and Orange counties; the White Burley to some extent in the counties first named, and largely in Switzerland county; and the seed-leaf varieties in Wayne, Randolph, and Shelby counties, and a portion in Greene. In the first named group of county smokers and Regie styles of tobacco are mostly grown, though about 40 per cent. was formerly taken for fillers in the manufacture of domestic plug. A considerable quantity is bought up by local dealers and made into strips. A large part of the growth, on account of its comparative freedom from gum, partakes of the nature of cutting leaf, and when cutters are scarce and high some of it is taken in this country for cutting purposes. It is better suited, however, for cutting in England, where a heavier type is used than in America. Of the whole amount produced in the southwestern part of the state 45 per cent. is classed as nondescript, 20 per cent. as heavy cutters, and 35 per cent. as fillers. Ten years ago 60 per cent. of the crop was fillers and 40 per cent. nondescript. A very small amount, made from the Lovelady and One-sucker varieties, is used for the African trade. The White Burley makes bright smokers or cutters, and is coming into favor, because it brings a higher price than the varieties heretofore grown. It is coarser in structure and duller in color than the same variety grown in Ohio and Kentucky, and only makes a substitute for the fine domestic cutting-leaf. In Switzerland county this variety is grown almost exclusively. About 3 per cent. of bright wrappers are made.

There is also a small quantity of a smooth, dark leaf grown in Spencer county suitable for the Italian market, and also a smaller amount of lighter color, taken by the French Regie, classed French B. The commoner sorts,

classed as nondescript, find the readiest market in Spain. The amount of heavy German tobacco grown is unappreciable. The product is generally poor, and it will absorb a great deal of water, which it parts with readily, for which reason a large part is converted into strips for cutting purposes in England.

A light-bodied tobacco, suitable for manufacturing plug in the United States, is grown to some extent on the elevated lands in Dubois, Spencer, Warrick, and Pike counties. A light-brown color is generally secured, but all colors are made.

To characterize properly the tobacco of this district is difficult; but it may be said generally that the great bulk of it is very porous and spongy, lean and bony, with little or no gum; colors not decided, but rather light, mottled, and dingy; generally, but not always, badly handled and badly assorted. It is usually grown by renters and tenant farmers in small patches, the average crop for each farmer being about 2,500 pounds. There is therefore a lack of uniformity, as also a lack of conveniences for handling, and a want of skill among the cultivators. It stands low in the markets of the world, and as an export tobacco only ranks next above that grown in Illinois. The tobacco is sold loose to local dealers.

The Indiana Seed-Leaf is grown in Wayne and portions of contiguous counties, in Shelby, and a little in Orange and other counties. The quantity produced in 1879 was 746,298 pounds. It is produced upon soils derived mainly from the drift. The production some years runs up as high as 1,600,000 pounds, but this is unusual, and only occurs when seed-leaf tobacco commands a high price. The crop is exceedingly irregular as to quantity.

The Kite-Foot tobacco, grown in small quantities by Germans in Clarke and Owen counties, deserves mention on account of the peculiar method of handling. It has a broad, short leaf, cures up a brownish color, with yellowish spots, and resembles the spangled tobacco of the eastern Ohio district. It has small fiber and stretchy leaves, and is cured with fire. In harvesting, the leaves are gathered from the stalks, as is done in eastern Ohio and in Florida. It is used in this country for making very common cigars.

SOIL AND CULTIVATION.

The manner of cultivating and curing tobacco in southwestern Indiana is identical with that practiced in the Lower Green River district of Kentucky, except that in Indiana the culture is not so uniformly well done, nor are the houses for curing it so well built. The stalks are also speared to a larger extent. All is air-cured except about 10 per cent., and, as a result, a large amount is very often injured by pole-sweat or mold. The crop of 1879 was very greatly damaged, and the average price was largely reduced in consequence of this injury.

The methods of planting, cultivating, curing, and managing the seed-leaf varieties may be seen by reference to the article on the Miami seed-leaf district of Ohio, with which the seed-leaf district of Indiana properly belongs.

The soil greatly influences the quality. Tobacco grown on the hills is brighter colored than that raised on clay bottom lands, and a good sandy loam is the best for its production, especially if lately cleared. Land that has been heavily manured, or an old barn lot, produces a dark, heavy leaf, fit only for shipping. In some sections the proportion of dark shipping tobacco has fallen off one-third, in others one-half, while bright wrapping and smoking have doubled in quantity. Cutting-leaf has increased one-sixth, and seed-leaf, not heretofore grown in some counties in the southwestern part of the state, comprises 5 per cent. of the crop. In the selection of soil for tobacco greater care is taken than formerly, and more attention is paid to its cultivation and handling; it is also better assorted, sized, and graded.

Throughout the tobacco-growing region of the state the soil preferred is a sandy loam on rolling lands and on plateaus where the drainage is good. On lands so situated, and where there is a considerable accumulation of vegetable mold, the yield is best. Full 60 per cent. of the land now occupied in tobacco is of this character. On newly-cleared land the custom is to plant tobacco the first and second years, and to follow the third year with wheat and grass. Full three-fourths of the wooded land is suited to the growth of tobacco, and soils which have a primitive growth of white oak, dogwood, sugar maple, and hickory are preferred. Tobacco grown on such lands freshly cleared is of finer quality, but is lighter than that grown on lands which have been cultivated for a time. The freshly-cleared lands are greatly preferred for White Burley. The rolling lands produce a better quality, but a leaf of less weight than the level and more moist lands.

Very small quantities of fertilizers have as yet been used, probably on not more than 10 per cent. of the area cultivated in tobacco. Barn-yard manure is the chief one used, though some few growers have tried superphosphates. The custom is to use from five to six cords of stable manure to the acre, at a cost of from \$5 to \$6. When superphosphates are used, the quantity applied is from 200 to 300 pounds per acre. Many farmers use less of both kinds. The effect of these fertilizers is a greater yield, especially on the clay soils; but where manures are used the cured leaf is darker and seldom of market value, except for shipping.

By continual cropping in tobacco the soil deteriorates very rapidly unless manured; but the custom being to follow it with wheat and grass, there has been little, if any, average deterioration, and the annual yield per acre has in some instances increased. The rotation generally adopted is to follow tobacco with rye or clover, clover being considered the best, the system practiced being to cut off the first growth of clover of the second year, turn under the second growth, and seed the land to grass.

Farmers deliver their crops to dealers at any time after it is stripped, the season beginning generally in January and ending in May. Two classes are made in the regie or southwestern counties, trash or lugs and leaf; the prices in 1879, when sold by grades, being: for lugs, 2½ to 3 cents; leaf, 4 to 6 cents; bright wrappers and fillers, 9 to 9½ cents, and some seed-leaf as high as 15 cents.

In this district lands suitable for growing tobacco are worth in the market from \$10 to \$25 per acre. Very little land is rented for money. The share system of renting prevails here, and generally throughout the South, under which one-third of the crop produced is given for the use of the land, the landlord furnishing barns in which to house the crop. When the landlord furnishes teams and everything except labor the tenant gets only half the crop. The tenant provides his own food, but is furnished with house and fuel. Labor ranges in price from \$10 to \$18 per month, with board, the average being about \$15; day laborers get \$1 per day.

The following estimate of the cost of production per acre has been furnished by a gentleman at Booneville:

Cost of seed-bed	\$0 50
Weeding, and attention to same	30
Rent of land (interest on price)	1 50
Stable manure	1 50
Cost of breaking land	2 00
Harrowing, lining out, and hilling	1 50
Drawing and setting out plants	1 25
Cultivating	5 00
Topping, worming, and suckering	2 50
Harvesting	5 00
Assorting and stripping	3 00
Bulking	20
Use of barn, laths, wagons, etc.	1 50
Delivering crop to market	2 00
	<hr/>
	27 75

Average yield per acre, 742 pounds.

Cost to produce, \$3 74 per hundred pounds.

In the southwestern counties barns are generally constructed of logs, at a cost of about \$50. They are open, and give little protection to tobacco in bad, damp weather. In the seed-leaf district framed sheds are usually employed for curing the crop, but they are generally of poor character.

STRIPS.

Strips are made at the following points in the state: Evansville, Booneville, Rockport, Grandview, Richland, Dale, and Huntingburgh. During the year 1879 the amount of strips put up in the state, as nearly as can be ascertained, was 1,710,000 pounds. For this work children from nine to twelve years of age are largely employed, being paid 40 cents for every hundred pounds of strips made. It is usual to pay less than this for stemming tobacco of broad leaf, and more for stemming lugs and tobacco having a narrow leaf. The amount of strips made by children will range from 50 to 100 pounds per day, while full-grown experts can make from 150 to 200 pounds, the quantity largely depending upon the quality of the tobacco stemmed.

Narrow tobacco loses from 40 to 50 per cent., wide tobacco about 33½ per cent., 10 per cent. of this being chargeable to the moisture in the leaf at the time of purchase. One large firm states that in a business which has covered thirteen years the largest average yield of strips for any one year was 62 per cent. of the tobacco bought. The absorptive capacity is variable, ranging from 33 per cent. for lean tobacco down to 15 per cent. for fatty sorts. There are four classes of strips made in the district: Long bright, long dark, short bright, and short dark. Lug strips are classified in the same way. These classes are again subdivided as to texture, fineness of fiber, width of leaf, and absorptive capacity, the lean strips being separated from those of more body. When in proper condition of dryness they are packed in hogsheads 58 inches high by 43 inches in the head. About 1,250 pounds net of strips are packed in each hogshead. Casks cost about \$2 each. Dealers pay for oak staves \$20 per thousand, and \$1 is required to pay the cost on each hogshead for setting up, including cost of hoops and headings. The lumber for headings costs from \$10 to \$12 50 per thousand feet.

It may be added that the best farmers pay but little attention to tobacco culture, nor are the best lands employed for its production. It appears to be a favorite crop only with a class of roaming farmers, who can always find a ready market for it, though at prices which ordinarily will barely pay for the cost of production.

CROPS OF INDIANA.

The figures in the following table for the years 1876, 1877, and 1878 are based on information derived mainly from the state bureau of statistics, and may be relied on as very nearly correct. The production, acreage, and yield per acre for 1879 are from the returns of the census of 1880. The value in primary markets, value per pound, and value per acre are ascertained from schedules returned to this office and other data:

Year.	Production.	Acreage.	Yield per acre.	Value in primary markets.	Value per pound.	Value per acre.
	<i>Pounds.</i>		<i>Pounds.</i>		<i>Cents.</i>	
1876	15, 015, 379	18, 769	800	\$750, 779	5. 00	\$40 00
1877	9, 401, 368	12, 704	740	305, 544	3. 25	24 05
1878	8, 190, 069	11, 088	740	286, 652	3. 50	26 00
1879	8, 872, 842	11, 055	742	443, 642	5. 00	37 11

Of the tobacco produced in Indiana in 1879, 746,298 pounds are estimated to be of the seed-leaf variety, 23,860 of the White Burley type, and the remainder of the Regie sorts, including heavy cutters, air-cured for manufacturing, and stogie fillers, classed as heavy tobacco.

CHAPTER VII.

CULTURE AND CURING OF TOBACCO IN KENTUCKY.

Kentucky takes the first rank as a tobacco-growing state, producing more than double the quantity of any other state, and more than one-third of the entire amount produced in the Union. The crops for the census years from 1840 were as follows:

	<i>Pounds.</i>
1840	53, 436, 909
1850	55, 501, 196
1860	108, 126, 840
1870	105, 305, 869
1880	171, 120, 784

Virginia took the first rank up to 1870, when Kentucky took the lead. Probably the largest and the best crop ever produced in the state was that of 1877. The production then reached 181,484,630 pounds, while for 1876 and 1875 the production was, respectively, 120,967,449 and 148,319,429 pounds. The entire area covered by the crop for 1879 (226,120 acres) shows an average yield per acre of 756.77 pounds. The area of its cultivation is widening every year, extending into the mountainous districts on the east and contracting the limits of the blue-grass region in the central portion of the state.

HISTORY.

In 1785 General Wilkinson, of Lexington, Kentucky, entered into a contract with the Spanish government in Louisiana to deliver several boat-loads of tobacco in New Orleans. Whether the tobacco he delivered was grown on the Ohio river or in the Spanish settlements on the Mississippi river is uncertain. Probably some of it was produced in Kentucky, for Mr. Wailes, former state geologist of Mississippi, after speaking of the production of the crop in that state, even as early as 1783, says:

It is certain, from some cause, either from fraud in packing, the falling off in quality, or from the competition of Kentucky tobacco, introduced into New Orleans under General Wilkinson's contracts with the Spanish authorities, or by their connivance, the price was so reduced that the further cultivation of it in Mississippi for exportation was, in a few years, wholly abandoned.

The early cultivation of tobacco in the West, and its progressive development, have never been made subjects of record. Being a commodity of small local consumption, and dependent chiefly for its value upon foreign demand, the early growers were without adequate markets at home, and were forced to rely upon a rude navigation to reach the seaboard. It was by far the most profitable crop which could be grown, and almost the only one which would command ready money at all times when placed in market.

The culture of tobacco in Kentucky was begun as a business by the early settlers from the old tobacco states, and notably by those from Virginia. It is well known that about the year 1810 it was grown in marketable quantity at several points in the southern and central portions of the state. During that year John Small and Edmond Curd, from Virginia, and in 1812 Martin Hogan, from the same state, and Thomas Morrow, from North Carolina, settled in Logan county, and commenced the cultivation of tobacco. The crops grown by these persons were

generally prized in hogsheads, hauled to the Cumberland river, and shipped by flatboat or keelboat to New Orleans, sold at low prices, and the proceeds of sale were brought back in coin, there not being sufficient commerce then to afford means of exchange. Some of these persons, however, found markets for their crops by hauling them loose in wagons a distance of twenty or thirty miles to local buyers, who were engaged to a small extent in manufacturing tobacco for supplying the home demand. From 1810 to 1820 other immigrants from the older states, among whom were Richard and William C. Browder and John P. Moore, from Virginia, engaged in the culture of tobacco as a permanent business. They were soon followed by others, and, being located at some distance from any shipping point on the Cumberland river, these persons manufactured their own crops, with the smaller crops of their neighbors, which they purchased. The manufactured product was then sent to Russellville and Nashville, Tennessee, and other neighboring points, where it was sold to supply the local consumption. The increase in production was small for the first decade, but from 1820 to 1830 there was a marked increase. By 1830 the culture had become established as a leading and permanent industry in Logan county, where it is still the most important staple.

Simultaneously with the beginning of the growth of tobacco in Logan county it was also commenced in Green, Barren, Hardin, and Warren counties under similar circumstances. Barren county, being convenient to shipping points on Barren river, and having advantages which attracted settlers in large numbers, soon became prominent as a tobacco-producing district. In Hardin county Peter McDaniel was one of the first growers. His first crop was grown in 1811, and during that year the entire crop of the county did not exceed ten hogsheads. This crop was sold to Allen & Beardsley, in the hand, at \$2 per hundred pounds. Hardin county, being remote from shipping points, made slow progress in the increase of production, and it was not until 1827 that such facilities were available to induce much interest in the business. In that year V. McDaniel became a local dealer in tobacco and bought a few small crops at 75 cents, \$2, and \$2 50 per hundred pounds for the different grades, prized and delivered at Stephensport, on the Ohio river. From this date the culture of tobacco gradually grew to be an important business. In Adair and Cumberland counties the business seems to have had a somewhat later beginning, and to have commenced in the former county about the year 1817, when two gentlemen from Virginia settled there and engaged in its culture. Their first crops were hauled to the Cumberland river and shipped to New Orleans, where good prices were realized (about \$8 per hundred pounds), the close of the war of 1812 having caused a large advance in prices, which was maintained up to the time when these crops were sold. These prices caused a large and rapid increase in the production, and the succeeding crop was a large increase on former ones. It was shipped to New Orleans, and sold for \$6 and \$7 per hundred. In Cumberland county the culture, as a fixed employment, is traced back to 1820, when the crop was shipped to New Orleans by flatboat out of the Cumberland river and sold for \$3 to \$5 per hundred. A succeeding season of better prices induced a large increase in the production, which, aided by better and cheaper facilities for shipping, caused by the advent of steam navigation, established tobacco culture as the leading industry of the county. The crops of this county at one time furnished the types most suitable for supplying the orders made by the French government. The date of the first crops of Breckinridge county is uncertain, but it was probably between the years 1810 and 1815, and were sold generally to local dealers. The nearness of the Ohio river, and the shipping facilities afforded by it, caused the establishment at an early day of home markets, which secured for the first crops raised an average of about \$3 per hundred pounds. Some planters shipped their crops to New Orleans by flatboat on their own account, but this method involved so much delay in realizing proceeds of sales that most planters preferred to sell in home markets at current prices, although very low. About 1840 better home markets were established by dealers, who stemmed tobacco and put it up for the English markets, and from this time the culture largely and rapidly increased. In Christian county the growing of tobacco was commenced about the year 1815, when one hogshead was shipped by flatboat to New Orleans, supposed to have been the first ever shipped from the county. About 1820 small crops, not exceeding one hogshead in any individual crop, were raised and shipped. Previous to this a few small patches were grown in the county, and the product was sold to a small manufacturing establishment, which was started at Hopkinsville in 1818, for the purpose of supplying the local demand. From this time the production gradually increased, owing to the advent of new settlers, principally from Virginia, and to the increased area of open lands. Between the years 1825 and 1830 the culture became an important branch of industry, and in the latter year it became general, stimulated by the success of previous growers and by better facilities of transportation. The first attempts to grow the crop were so unprofitable that many who engaged in it abandoned it for the culture of cotton and hemp, which, in turn proving unprofitable, was abandoned, and the growing of tobacco was resumed.

The district bordered by the lower part of the Ohio river was not settled so early as other tobacco-producing sections of the state, and it has not been possible to obtain fully the historical facts in regard to the culture in this section. In Union county the culture was commenced in 183, from which time to 1850 the tobacco grown in the county was nearly all hauled to Henderson, on the Ohio river, and sold to stemmers at \$1 to \$4 per hundred on credit, one-half payable in March, and the other half on the 1st of June following.

These districts were the field of the earliest establishment of this important industry west of the Alleghany mountains

Very little is known as to the early methods of culture and curing or the varieties most generally grown. The methods were for a long time primitive and unskillful. The culture was with indifferent implements, used without dexterity or skill, and the curing was generally done by hand-firing, or with no firing, as the producer might fancy. The rude and imperfect methods of culture, however, found a compensation in the freshness and strength of the virgin soils, and the yield of product under these conditions was as favorable in weight as it has been since under more skillful and perfect modes, but was inferior in quality.

CLIMATE.

The climate of Kentucky is remarkably pleasant, though variable. The mean annual temperature is about 55°. The thermometer often falls to 20° in winter, and sometimes, though rarely, goes below zero; in summer it rises to 90°, and very rarely to 100°. Winter sometimes continues from late in November until the last of March, but is often so mild that good grazing for cattle and sheep may be had throughout that period. The prevailing winds in spring and summer are from the southwest; in winter, during the coldest periods, from the northwest. Rain is very frequent in winter, but the summers are sometimes characterized by protracted droughts. Observations by the signal service at Louisville from September 11, 1871, to October 31, 1880, show a mean average temperature for the seasons as follows: Spring, 56.1 degrees; summer, 77.4; autumn, 56.9; winter, 37.3; average range, 56.9; highest temperature recorded, 102; lowest, 10 below zero; mean of prevailing winds, south; mean annual precipitation, 48.36 inches. Observations at Springdale, in Mason county, the center of the White Burley tobacco district, for a period of nearly 28 years, extending from July, 1841, to December, 1870, show: Mean average temperature—spring, 53.26 degrees; summer, 72.42; autumn, 54.64; winter, 34.50; for the year, 53.71. Mean amount of precipitation for 24 years and 3 months of this period: Spring, 12.90 inches; summer, 13.46; autumn, 10.07; winter, 12.15; for the year, 48.58. At Danville, observations for 12 years, to December, 1870, show an average temperature for the different seasons as follows: Spring, 56.28 degrees; summer, 75.58; autumn, 58.56; winter, 37.84; average for the year, 57.07. The average rainfall for 8 years, to December, 1866, for the seasons, was: Spring, 12.87 inches; summer, 12.76; autumn, 8.08; winter, 11.92; average for the year, 45.63.

TOBACCO DISTRICTS.

There are eight tobacco-growing districts in Kentucky recognized by the trade, each having some peculiarities of soil producing types more or less distinct. These districts are:

- I. Paducah, or western district, embracing the counties of Fulton, Hickman, Graves, Ballard, McCracken, Marshall, and Calloway.
- II. Ohio River district, embracing the counties of Livingston, Crittenden, Caldwell, Lyon, Hancock, Breckinridge, and Meade, in two separate bodies, the Lower Green River district lying between them with its coal measures.
- III. Lower Green River district, embracing the counties of Henderson, Union, Daviess, Webster, Hopkins, McLean, and Muhlenburgh; resembling adjacent districts of Indiana and Illinois.
- IV. Green River district, embracing the counties of Butler and Ohio.
- V. Upper Green River district, embracing the counties of Barren, Warren, Hardin, Grayson, Edmonson, Hart, Green, La Rue, Marion, Taylor, and Allen.
- VI. Clarksville district, embracing the counties of Trigg, Christian, Todd, Logan, and Simpson, and seven counties in Tennessee.
- VII. Cumberland River district, embracing the counties of Metcalfe, Russell, Adair, Clinton, Cumberland, Monroe, Casey, Wayne, and Pulaski.
- VIII. White Burley district, embracing what was formerly known as the Boone County district, the Mason County district, the Pendleton County district, and the Kentucky River district. The following counties are now included in the White Burley district, though it is rapidly widening, and may soon embrace several other districts: Boone, Kenton, Campbell, Gallatin, Grant, Pendleton, Bracken, Carroll, Owen, Harrison, Robertson, Mason, Lewis, Fleming, Montgomery, Nicholas, Bourbon, Scott, Franklin, Henry, Trimble, Oldham, Shelby, and Woodford. The cultivation of the White Burley is even invading the blue-grass region of Fayette and the surrounding counties.

PADUCAH, OR WESTERN DISTRICT.

GEOLOGICAL FEATURES, SOILS, AND TYPES OF TOBACCO.

This whole district has been referred to the Tertiary formation, though there are strips lying on the Mississippi and Ohio rivers which properly belong to the Quaternary, and a belt on the Tennessee river belonging to the sub-Carboniferous. The soil, where sufficiently elevated to be well drained, is highly productive. Its physical condition, in the main, is excellent, being very fine-grained, and much of it resembling in color and pulverulence a bed of ashes.

Ballard county, which occupies the northwestern corner of the district, has a deep vegetable loam, which rests, at variable depths, upon clay and sand. Parallel with the Ohio and the Mississippi rivers is a belt of timbered land 5 or 6 miles in width, the timber growth of which is black oak, white oak, tulip tree, hickory, maple, hackberry, elm, cypress, and beech. In the alluvial bottoms cottonwood and sweet gum abound, and the soil is black and

sandy. The soil of the timbered belt is a dark gray, and contains nearly 50 per cent. of siliceous matter in its composition. The alluvial soils grow a big, coarse, leafy tobacco, which cures up a uniform red color, and is chiefly used for making strips. On the timbered uplands a richer and finer leaf is grown that commands a better price, but it is principally suited to the Regie trade. Between this belt of timbered land and Mayfield creek, going south, is a broad stretch of barren land. These "barrens" in Ballard county form an elevated plateau, which as an open pasture is unexcelled. The timber growth is very inferior, and consists of a few harsh black-jack oaks, hickory, post oak, and red oak, with an undergrowth of sumac, dogwood, and hazel. The soil of the "barrens" is very free and generous, and is well adapted to the growth of fine tobacco. The "yellow leaf" of Ballard county is second in reputation only to the "gold leaf" of North Carolina, and it differs from the latter only in being of larger size and richer in the essential oils of tobacco. The existence of so much oily substance in its composition is a disadvantage, inasmuch as it causes the leaf to blacken under pressure, becoming a mottled yellow-brown and black. South of Mayfield creek the land is more undulating, the soil deeper, and the timber is large and abundant. In color, the soil, with the exception of that in the southeasterly portion of the county, is dark gray and black, with a dirty buff-colored subsoil, and will grow a good heavy shipping leaf. Around Milburn the soil is of a light gray, and is not so productive, and the tobacco grown on this land is of a more flimsy character. Underneath all the soils of the county, excepting only the alluviums on the larger streams, there is a bed of drifted material, composed of rounded pebbles of quartz, gneiss, and sandstone, which are sometimes cemented together by the oxide of iron, but are more generally lying loose, as though left by a receding stream. These beds of gravel are from ten to fifteen feet in thickness, and lie at variable depths beneath the surface. Sometimes the pebble beds give place to local accumulations of fine sand, and where this is the case, and the beds come near the surface of the ground, the land becomes exhausted very rapidly under cultivation. Should the surface be rolling, deep gullies form with surprising rapidity, and the most careful attention is demanded to preserve the soil from becoming utterly worthless. The census returns of 1880 show the average yield in the county to be 723.92 pounds per acre, which is a little less than the average for the western district, which is placed at 739 pounds.

Hickman county is generally level, though sometimes rolling. The soils and the timber growth are much like those in the southern part of Ballard county, on the north. With the exception of the alluvial bottoms, the soil is dark gray or ash colored, and sometimes whitish, very light, and generous. It has a large proportion of silica and insoluble silicates in its composition, with a variable quantity of lime, phosphoric acid, potash, and oxide of iron. Where there is a considerable amount of alumina in its composition the soil has greatly increased power to catch and hold organic matter, thus forming a loam of great fertility. The quality of tobacco produced is coarse, and is only suitable for stemming purposes and for the Regie trade. Only 658 acres are reported, which is the smallest quantity grown in any county in the district, except Fulton, which is heavily timbered, and has a soil similar to that of Hickman. Cotton and the grasses have taken the place of tobacco to a large extent. The tobacco grown is very inferior in quality, being coarse, with large stems and fibers, though the yield per acre is satisfactory, being a fraction over 702 pounds.

McCracken county has soils of very unequal fertility. In the eastern part of the county the surface is undulating and the soil is light-brown in color, with a mulatto subsoil, and of medium fertility. The timber growth is black oak, hickory, and black-jack oak. By far the largest amount of tobacco is grown in this part of the county, and when the lands are first opened the quality is very fine, the color bright, and suitable for making fine wrappers for plug. On old manured lots a rich and heavy German type is produced. In the eastern portion of the county the surface is flat, and post oak forms the predominating tree growth, intermixed with occasional white oak. Flat post-oak lands are not at all suitable for the growth of tobacco, and indeed are scarcely suitable for any other crop. These flat lands are confined to the region drained by the Clark river. In the middle part of the county the surface is broken, the soil is thin, and tobacco is not grown to any considerable extent. The chief difference between the soils of this county and those of Ballard is that they are more gravelly and sandy, lighter in color, have less clay in their composition, and are not so fertile. The flat lands are often "water-logged", and will scarcely produce anything. The average yield of tobacco per acre for the county is about 717 pounds.

Graves county, lying south of McCracken, raises more than twice the amount of tobacco grown by any other county in the district. Thirty years ago there was no timber in the county, except along the margins of streams or on wet lands, but since the annual fires have been interdicted a scrubby growth of hickory, red oak, and post oak has sprung up, and has covered all the uncultivated portions, and on the wet lands or low swales water oak, cypress, gum, walnut, cherry, maple, tulip tree, ash, beech, cucumber tree, and many other varieties are found. The best tobacco soils are indicated by the growth of red oak and mocker-nut hickory (*Carya tomentosa*). The soil of at least two-thirds of the county is a grayish-yellow, underlaid with pebbles and sand. On the streams a whitish soil predominates. On the ridges, mainly in the eastern part, where the prevailing timber growth is hickory, a fine yellow tobacco is grown, which commands a very high price. The product of this county is taken for the French, German, and Italian markets. The black German type is produced on rich soils, where the original timber growth was the tulip tree, hickory, oak, gum, walnut, with an undergrowth of hazel and sumac. If well cultivated, the soils of this county will resist successfully the effects of drought and of wet weather. A hard clay lies beneath the surface, which, unless well broken, compacts closely, and the water is held by the hard pan beneath. Deep plowing

and a thorough pulverization of the surface soil have been found of greatest benefit in enabling the tobacco plant to resist the blighting effects of drought or of exceeding wet weather.

Marshall and Calloway counties, which occupy the eastern side of this district, may be considered together. On the eastern edge of these counties is a fragmentary belt of the sub-Carboniferous rocks, and beds of marl are frequent, interstratified with sands and clays of varying colors. In some portions there are areas of flat, wet lands, corresponding with some portions of West Tennessee. Generally the soil is rich and loamy, with a considerable admixture of siliceous matter, which makes it very loose and light. Accumulations of whitish clay occur, and the soil is then cold and unproductive. The belt lying along the Tennessee river is hilly, and in places rugged, with the outcropping of the sub-Carboniferous limestones, and beds of chert, liberated by the dissolving of these limestones, are common. Generally the soils in this belt are thin and unproductive, except where basins occur, or where the alluvium of the river prevails. A very fine type of yellow tobacco, suitable for wrapping purposes, is grown upon the sandy loams and gravelly ridges of these two counties, and shipping leaf, much resembling that grown in Graves county, is produced on the richer soils. Of the two counties, Calloway produces more than twice as much tobacco as Marshall, and has a larger area of fertile soils. The quantity of yellow tobacco made in Calloway is also far in excess of that produced in Marshall, the latter county having a very limited area among the ridges adapted to its growth. Marshall county, however, produces a long, red, light-bodied tobacco, suited for the French market. On the generally level surface west of the broken area occupied by the Carboniferous rocks the timber is small and of the same character as that which prevails in Graves county, but is much larger in the rugged region bordering the Tennessee river, consisting of the varieties common to the river basins.

A limited area in Graves, Ballard, McCracken, and Calloway counties produces about 33 per cent. of rich, heavy, gummy tobacco, suited for the German market, and approximating closely the Clarksville type, but inclined to higher colors.

CLASSIFICATION OF TYPES.

Probably no part of the United States grows a greater variety of types of tobacco than the district under consideration, almost every sort demanded by foreign and domestic markets being produced, as classified in chapter II. These classes are as follows:

German Shipper, to which only about 5 per cent. of the product belongs.

Swiss Wrapper, grown on fertile uplands well manured.

African, which may be grown on rich bottom soils, and includes about 20 per cent. of the product.

German Saucer, which grows in greatest perfection on good rich second-year uplands without manures.

Regie tobacco, which includes: I. French A, B, C, chiefly grown in Marshall and Calloway counties; II. Italian; III. Spanish; IV. Austrian, German Spinner, and manufacturing leaf, both fillers and wrappers, the latter varying from lemon-yellow to very dark.

There has been very little change in the types of product during the past ten years, but probably the nondescript has been reduced to some extent, and the yellow or bright wrapper increased. The following will approximate the proportions of each grade for the district:

	Per cent.
Dark and red shipping.....	35
Fillers, sun- and air-cured.....	20
Bright wrappers.....	5
Cutting.....	15
Nondescript.....	25

The constancy of the proportion of types is due mainly to the large quantity of new land cultivated in tobacco, fully one-third of the crop being planted upon virgin soil, a third on land which has grown only one crop, and the remainder upon manured lots.

VALUE OF THE CROP.

The prices received by planters have a very wide range, from \$2 per hundred for inferior lugs to \$40 per hundred for fine bright wrapper. The average price received by the farmers is placed by a good authority at \$5 per hundred. Mr. T. H. Puryear, of Paducah, who has kept a record of the receipts and prices at that point since 1875, furnishes the following statement, which will fairly represent the prices received by a large majority of the planters:

Year.	Lugs.	Leaf or good.
1875.....	\$9 00	\$18 00
1876.....	6 00	11 00
1877.....	4 00	8 00
1878.....	3 00	5 50
1879.....	3 50	6 00
1880.....	4 00	6 00

The cost to the planter of inspecting and selling on the Paducah market is \$1 50 per hoghead. Out of the tobacco now raised in the district domestic manufacturers take only a part of the sun- and air-cured fillers and some of the bright wrappers.

STRIPS.

It is estimated by a large dealer that 5 per cent. of the total product grown in the Paducah district is made into strips for the European market. The great development of leaf attained by the tobacco plant on the rich lowlands and the deep brown colors produced on the upland bottoms, and, above all, the spongy nature of the leaf when grown in such situations, admirably fit it for making strips.

Two establishments for making strips are in operation in this district: one at Paducah, which made about 380 hogheads in 1879, and one at Hazlewood, which made 75 hogheads, making the total product 455 hogheads, requiring about 825,000 pounds of tobacco in the stem to produce 500,000 pounds of strips, there being an estimated loss from taking out the midrib of 33 per cent., and the loss from weight between the condition in which it is received from the planter and the condition in which it is prized as strips is placed at from 5 to 10 per cent. * The loss from taking out the stem, however, is variable. If the tobacco is long and broad, with small stems, the loss does not exceed 25 per cent., but should the leaves of the tobacco be narrow and of light texture, with large stems, the loss may even exceed 40 per cent.

The price paid for stemming varies from 40 to 50 cents per hundred pounds of strips made. An active man or woman may make from 250 to 300 pounds of strips a day in large leafy stock; the average, probably, is under 200 pounds.

COST OF PRODUCTION.

Nothing can be more unsatisfactory than the conflicting and often irreconcilable differences in the estimates made of the cost of production. Differences in the soil, in the labor employed, and in the distance from market, complicate the question. Comparing estimates, it appears that the average cost of growing the crop for this district is not far from \$4 per hundred pounds on the best lands, and from \$5 to \$6 on inferior tobacco soils. Three acres are usually allotted to each hand, and the average yield per acre for the district is 739 pounds, or 2,217 pounds to the hand. The price of labor is \$12 per month the year round, and by the day 75 cents. The following will give an idea of the profits of farming in this district, though it is difficult to estimate the actual cost of producing the tobacco crop:

Dr.	
Wages of one man and board for year	\$200 00
Rent of ten acres of land for wheat, at \$3	30 00
Rent of fifteen acres of land for corn, at \$3	45 00
Rent of three acres for tobacco, at \$4	12 00
Use of team and feed for same	50 00
Use of barns and tools	15 00
Total	352 00
Cr.	
By 2,217 pounds of tobacco, at \$5	110 85
By 120 bushels of wheat, at \$1	120 00
By 600 bushels of corn, at 30 cents	180 00
Total	410 85
Profit on one hand	58 85

In this statement the expense account is charged with the actual rent of the land, and not merely with the interest on value. The best tobacco lands in the district may be bought at a price not exceeding \$25 to \$30 per acre, and for such as will give the average yield the prices range at from \$18 to \$20 per acre.

Planters frequently have tobacco and other crops raised on "shares", receiving one-third for the use of the land alone, or one-half when they furnish all except the labor. If the landlord furnishes rations to the cropper and his family, they become a charge against the tenant's share of the crop.

The varieties of tobacco cultivated, and the methods of curing and handling adopted, have not been such as to give the product a high character, either at home or abroad. Old habits of raising a shipping leaf cured with smoke and fire are difficult to surmount, and, as a consequence, the cultivation of tobacco cannot be said to be remunerative. One danger demands notice. The looseness of the soil, while making it easy of tillage, makes it also easy to wash. Fields are cultivated for a few years and often abandoned, to be furrowed with gullies, down which the soil is carried with every rain. Many of these scarified old fields, growing up in persimmon and sassafras sprouts, may be seen in passing through the country. When these gullies have once cut through the thin loamy bed of the surface and reached the stratum of sand or gravel beneath their destructive power is almost unlimited. A little attention at first checks them.

The following statement exhibits the total product of the Paducah, or western district, for the years 1876, 1877, and 1878; also the total product and acreage for 1879. The table is mainly from returns to the state auditor, and only the figures for 1879 are from census returns:

	Pounds.
Product in 1876	11,538,036
Product in 1877	21,395,381
Product in 1878	9,664,497
Product in 1879	20,843,497
Acreage in 1879	28,205
Average yield per acre in 1879	739

THE OHIO RIVER DISTRICT.

TOPOGRAPHY.

Most of this district is very broken in surface, has but a small extent of level area, and the two sections are very much alike in topography. The northern border of the eastern group of counties and the northern and part of the western line of the western group are skirted by the Ohio river. The Cumberland river runs through Lyon and Livingston counties of the latter group, and the Elizabethtown and Paducah railway passes through its southern end. These natural and artificial highways afford convenient facilities for transportation.

TYPES OF TOBACCO PRODUCED.

In the eastern group the most decided types are of light body; in the western counties the larger part of the product is heavy-bodied tobacco. In Breckinridge county especially, and to a smaller extent in Hancock and Meade counties, the light leaf has been highly valued as fillers for chewing plug, but has recently lost value on account of changes in the tastes and requirements of manufacturers and consumers. This type is of moderately light body, of delicate fiber and texture, of sweet flavor, and of clear bright or red colors, and a very small proportion is suitable for bright wrappers, or for fine-cut chewing or the higher grades of smoking-tobacco.

The heavy types of tobacco grown in this section of the Ohio River district are the product of alluvial lands, or of strong uplands heavily manured. They want smoothness of texture, but are more oily and waxy and less spongy than the same types produced in the Lower Green River district, and have about the same general adaptation, being largely used for making strips, and, to some extent, are available for supplying the demands of the French and the Italian governments.

In Breckinridge county 10 per cent. of the product is classed as dark shipping, 30 per cent. fillers, 5 per cent. bright wrappers, 5 per cent. cutting, and 50 per cent. nondescript, with but little variation in these proportions during the last ten years.

Of the product of Hancock county for 1879, 33 per cent. is dark shipping, 20 per cent. fillers, 20 per cent. cutting, and 27 per cent. nondescript; and of the crop of 1869 there was 20 per cent. dark shipping, 10 per cent. fillers, 10 per cent. cutting, and 60 per cent. nondescript.

In Meade county the crop of 1879 contained a larger proportion of nondescript than either of the two counties above named.

In the western group both light and heavy tobaccos are grown, the latter predominating. The heavy tobacco of this section is coarse and rough in texture and fiber, with only a moderate supply of oils, and furnishes a very small proportion of stock for manufacturing or for the better export types. A small part of the product is available to supply the demands of the French and Italian governments, but the bulk of this heavy tobacco is of low grade, and finds its way to inferior markets. This group of counties produces a tobacco of lighter body, a small proportion of which is suitable for plug fillers, for bright wrappers, and fine smokers, but of quality somewhat inferior to that of the similar types grown in the eastern counties of the district.

Of the crop grown in Crittenden county in 1879 the proportion of dark shipping is estimated at 25 per cent.; of fillers, 10 per cent.; and of nondescript, 65 per cent. Of the crop of 1869 40 per cent. was dark shipping, 12 per cent. fillers, and 48 per cent. nondescript.

Of the crop in Lyon county in 1879 there was 40 per cent. dark shipping, 20 per cent. fillers, 10 per cent. bright wrappers, 5 per cent. cutting, and 25 per cent. nondescript. In 1869 the proportions were: Dark shipping, 30 per cent.; fillers, 30 per cent.; bright wrappers, 15 per cent.; cutting, none; and nondescript, 25 per cent.

So far as can be ascertained, the average of the classification given for Crittenden and Lyon counties will very nearly describe the product of the other two counties of this section.

VARIETIES OF TOBACCO PRODUCED.

Most of the varieties grown in this district are common to the state. There are some local varieties, among which are the Lacks, of heavy weight, well colored, broad leaf, of fine fiber, and a strong grower; Greenwood, long

and narrow leaf, difficult to cure, of uniform color, and adapted for export purposes; Big Whig, leaf of light body, cures a bright color, and is very showy in general appearance.

Of the varieties Yellow Pryor is preferred, because its product is suitable for fillers for plug manufacturing and for redrying in the leaf for shipment to England for cutting, and it is said to have more "chew" in it and a better flavor than most other varieties. Blue and Henderson Pryor, Big Whig, and Lacks are used for strips, for which purpose they are well suited, and also for supplying various export demands. Greenwood, One-sucker, Twist-bud, and Long Green have no special adaptation, and pass into export stocks in the leaf. When handled and cured with especial care a small proportion of the yield of these varieties finds a sale as fillers for manufacturing. There is complaint, probably well founded, that no care is taken to preserve the purity of varieties; that mixed sorts have resulted, and that the difficulty of growing and curing any desired type or grade has been much increased by this too common neglect.

A growing disposition is manifested by planters, especially those of the eastern group of counties, to engage in the cultivation of the White Burley, and the light types produced in this district are no longer sought for by manufacturers.

GEOLOGY AND SOILS.

The soils of the whole of this district, with small exception, are derived from the Chester group of rocks, which consist of alternate beds of impure or earthy limestones, shales, and sandstones. In the eastern group the sandstones and shales are predominant as surface formations, imparting to the soils a siliceous character. In this group is also found a part of the Carboniferous formation, extending over a considerable area of Hancock county. In Breckinridge county there is a separate and distinct bed of coal, of a highly resinous character, and resembling cannel coal, and also a large exposure of the Tar-spring sandstone, which forms the base of the Chester group, and is the source of several noted "tar" springs. There are also beds of green and red marly shales, very rich in potash and soda, the soils upon which are esteemed, as being finely adapted to the production of tobacco.

The geology of the western group of counties is somewhat similar to that of the eastern, but more calcareous and less siliceous. The soils of this block of counties may be divided into calcareous and siliceous, the former occupying the lowlands and a small portion of uplands, while the latter is found exclusively on the higher lands. The calcareous soils vary in character as they are derived from the limestones of the Saint Louis or the Chester group, and the sandy soils differ as they are derived from the sandstones and shales of the Chester or the Carboniferous group. The limestone lands consist of black loam, rich in vegetable mold, overlying a red-clay subsoil. The freestone soils are of a yellowish or grayish color, upon a subsoil of yellow or blue clay; and when resting upon a blue clay these sandy soils are of the poorest grade.

The limestone soils may be divided into two classes: lowlands, consisting of Quaternary beds; and uplands, consisting principally of outcroppings. The lowlands produce a type of heavy, coarse, large-leaved tobacco; the uplands yield a product of finer fiber and texture, more compact in structure, but with smaller leaf. Where the limestone uplands are derived from the Saint Louis group the soil is generally fertile and strong, producing a smooth and oily type; but the tobacco grown upon limestone soils derived from the Chester group has well-developed stem and fiber, but is deficient in width of leaf, in weight, and in supply of oils. The siliceous uplands produce the light types.

In Breckinridge and the other counties of the eastern group old lands of calcareous character, well manured, are preferred for rich and heavy types, and new or freshly-cleared lands for the finer types of light and colored tobacco. The timber growth upon preferred lands consists of hickory, sugar-tree, dogwood, beech, black-jack, hazel, white oak, and walnut.

In Breckinridge county three-fourths of the tobacco crop is grown upon old lands and one-fourth on freshly-cleared soils, and in Hancock county one-third upon old and two-thirds upon new lands. In the first-named county all the wooded lands are reported to be adapted to the growth of tobacco; in the latter the proportion is estimated at 90 per cent.

In the western section of this district the soils preferred for tobacco are limestone, with a timber growth of black oak, hickory, dogwood, post oak, walnut, and gum. Two-thirds of the crop in Caldwell county is produced upon limestone soils; in Crittenden, one-half; in Livingston, three-fifths. The proportion of freshly-cleared lands occupied by tobacco is estimated at from 30 to 50 per cent.

The rate of soil deterioration is variously estimated in different localities. One planter reports that "after three years of continuous culture in tobacco the soil is considered useless for that or any other crop"; while another insists that "tobacco does not impoverish land, and when followed by wheat the yield of the latter is much better". Others place the rate of deterioration at from 5 to 33 per cent. The weight of evidence indicates that there is throughout this section a tendency of the soils to deteriorate rapidly, except under careful management. A large part of the general surface is abruptly broken. Lands upon the Quaternary formation are acknowledged as of very durable fertility. From 50 to 85 per cent. of the wooded lands of this section are considered adapted to the growth of tobacco.

Planters usually plan to follow tobacco with wheat seeded to clover. Sometimes rye is sown in the fall and turned under in May following, or allowed to ripen and fall on the land, and this is said to reinstate the soil after

one crop of tobacco. The available supply of farm manures is too small to afford extensive help in the work of soil recuperation; small grains, clover, the grasses, and sometimes "rest", by suffering a growth of weeds, bushes, and briers, are the methods in general use.

INSECT ENEMIES AND DISEASES.

The flea-beetle is probably not so troublesome as in other sections of the country less broken in surface and not so heavily wooded. The cut-worm, horn-worm, and some species of grasshoppers are common. "Frenching" is reported to prevail under conditions which favor it. "Fire" is not complained of to serious extent, the surface configuration of the district being such as to afford ready means of drainage.

COST OF PRODUCTION.

No reports were made from either section of this district as to the value of tobacco lands, cost of labor, etc. It may be assumed, however, that the estimates already made for the Paducah district will apply very nearly to that of the Ohio river.

VALUE OF THE CROP OF 1879.

In Hancock county the average value is stated as \$4 50 per hundred pounds, with dark shipping at \$3 50 and the light types at \$5. In Breckinridge county the average value is estimated at \$6, with trash at \$2; lugs, \$2 50 to \$4; dark leaf, \$4 25 to \$5; good leaf, \$5 50 to \$8; and colored leaf, \$9 to \$12. In Lyon county the average value is estimated at \$4. In Crittenden, lugs, nondescript, \$1 50 to \$2; good lugs, \$3 to \$4 50; common leaf, \$3 50 to \$4 50; good leaf, \$5 to \$7; and what is known as cutting leaf, \$5 to \$12. In Caldwell county, the average is estimated at \$4 75, and in Livingston county at \$4 50.

GENERAL FACTS AND STATISTICS.

The manures used in this district are always applied upon old lands, and are almost entirely the product of the stable and the barn-yard, used both in the hill and broadcast. Commercial fertilizers are used to some extent, almost exclusively in the hill, about an ounce to each plant; from three to four hundred pounds per acre in the few instances where employed broadcast. Of domestic manures, that from the stable is usually applied in the hill, and the coarser material from the barn-yard is spread broadcast. In Breckinridge county about 1 per cent. of the tobacco land is fertilized with commercial manures, the results being of uncertain character. In Hancock county about 20 per cent. of the area cultivated in tobacco is manured from the stable and the farm-yard, at an average cost of \$6 per acre, producing an increase of 60 per cent. in yield, with a large improvement in quality where heavy body is desired. In Lyon county about one-third of the tobacco acreage is fertilized with domestic manures, increasing the yield about 50 per cent., but making a coarser product. In Crittenden county manures are used on one-fifth of the tobacco land; these consist of stable manure, bone dust, and "Homestead Tobacco Grower", and are estimated to increase the yield one-third, with 50 per cent. improvement in quality. In Caldwell county about one-fourth of the tobacco is manured with domestic and commercial fertilizers, at a cost of from \$3 to \$5 per acre, resulting in an increase of one-fourth in yield, with improvement in weight and supply of oils in the cured product. In Livingston county two-thirds of the surface is manured with stable and lot manure, a shovelful being applied to each hill, at a nominal cost, producing one-third increase in yield, with larger size and weight of plant.

The average yield per acre of the crop of 1879 in this district was estimated at 720 pounds, and the damage to the quality of the crop from different causes was estimated as follows: Green cutting, 10 per cent.; house-burn, 14 per cent.; stem-rot, 10 per cent.; worm-eaten, 2 per cent. These estimates were made before the crop was marketed, and may admit of material modification since its full delivery. Mold forming on the cured leaf produced greater loss than any other form of injury.

The following statement shows the production, acreage, yield per acre, value of crop in farmers' hands or in primary markets, value per pound, and value per acre of the tobacco crops in the Ohio River district. The production for the years 1876, 1877, 1878 is obtained from official returns made to the auditor of Kentucky, and that for 1879 is from returns made to the Census Bureau:

Year.	Production.	Acreage.	Yield per acre.	Value of crop in farmers' hands.	Value per pound.	Value per acre.
	<i>Pounds.</i>		<i>Pounds.</i>			
1876.....	11,465,224	17,030	650	\$745,239 50	0.50	\$42 25
1877.....	18,067,915	21,779	871	1,043,235 32	5.50	47 00
1878.....	8,214,747	13,691	600	451,811 08	5.50	33 00
1879.....	18,184,520	18,207	721	650,225 00	5.00	36 03

THE LOWER GREEN RIVER DISTRICT.

TOPOGRAPHY.

The Ohio river separates this district from those of a similar character in Illinois and Indiana. Much of the surface is more or less broken, though not rugged, and there are large areas very slightly rolling or almost level. An irregular range of hills extends along the western and southern border, forming a dividing line between the waters of the Cumberland and those of the Green river. This range forms the only abruptly broken surface of any extent in the district. Green river, which is navigable at all seasons, passes through the northeastern part; the Ohio river skirts its northern border; the Saint Louis and Southeastern railway traverses its center from north to south, and the Elizabethtown and Paducah railway crosses it a short distance south of a central line east and west. All parts of the district are within a few miles of railroad or river, and are well provided with facilities for transportation.

The soils of this district are peculiarly adapted to the growth of tobacco, and have less general adaptation to other crops than those of most other sections of the state. From the early settlement of this territory tobacco has been the staple crop, furnishing employment for a large amount of capital and labor, and several towns owe their prosperity and commercial importance almost entirely to their positions as tobacco markets.

TYPES OF TOBACCO PRODUCED.

The types of this district may be divided into the two leading lines of heavy and light tobacco, and subdivided into several sub-types.

On the Ohio river bottoms the tobacco grown is large, coarse, and heavy, of strong texture, thick and leathery, with little oil, easily dried, and of great capacity for absorption. This product is used almost entirely for making English strips, some portions of the longer leaf being suitable for shipment to Africa. On creek bottoms and the alluvials of Green river, and on flat lands of good soil overlying a red-clay subsoil, a richer and smoother heavy tobacco, of less absorptive capacity and more oily, is produced, and consequently it is not so generally used for strips as the former. When of sufficient strength and delicacy it is used for dark wrappers, and if free of gum, smooth and of fine texture, it is used for cigar wrappers. The lower grades are sometimes sold for fillers in making common dark plug for smoking in Canada. The lowest grades of both these sub-types are used for cutting into cheap smoking tobacco and for export. A small proportion of the higher grades of the Green river heavy tobacco is suitable for filling orders for the French and Italian governments.

The light type of tobacco is grown upon the more siliceous soils of the rolling or broken lands. When of good length and breadth and sufficiently tough it is suitable for strips; if of light and thin body and light color it is used for brown roll wrappers. Bright lugs and the lower grades of bright and light leaf are made into strips for brown roll, but the more fancy kinds of bright yellow leaf, with stems of the same color as the leaf, are used for cutting into "bird's-eye" smoking-tobacco. The coarser and rougher grades of all the light types are used for cutting into smoking-tobacco, and the darker and tougher grades for spinning. This type, until within a few years, entered largely into domestic consumption. Its mildness of natural flavor and great capacity for receiving artificial flavors made it especially fit for the use of manufacturers until the demand for an article of lighter texture, more decided color, and finer fiber established a standard not reached by any but the very best and most carefully handled product of this district.

It is not possible, with the information at hand, to determine the average proportion of each type in the cured product. The current opinion is that the general product is increasing in heaviness of body.

Opinions differ as to whether the quality of the product has improved or deteriorated since 1870. Dealers assert that the average quality is not so good as it was ten years ago, and account for the deterioration by the decrease in the proportion of the crop grown on fresh lands. Many planters admit the falling off in quality, and attribute it to various causes, as a series of unfavorable seasons, the too frequent use of mixed seed, or an impoverished soil. On the other hand, equally well-informed planters claim that there has been no deterioration, except perhaps a relative one, in so far as the requirements of consumers have raised the general standard of quality. In some localities it is maintained that the quality of the product has improved, because of better arrangements for handling and curing; that planters are beginning to understand that the higher grades alone pay a profit over the cost of production, and are planting less and making a better quality; and there is little doubt that the seasons are less favorable than when larger forest areas protected the fields and modified the effects of excessive rains or cold winds, or the sweep of storms.

VARIETIES AND THEIR PECULIARITIES.

Blue, Yellow, and Henderson Pryors are most generally cultivated. Tennessee Red, Orinoco, Little Hill, Twistbud, and Long Green are also planted. The low prices realized for export types have brought into favor varieties the product of which is more suitable for domestic manufacturing. The Pryors make a leaf of good length and breadth, of delicate fiber and texture, and are well adapted for making wrappers and fillers. They are easily

cultivated, healthy in constitution, and cure readily. The Yellow Pryor is especially popular on account of its habits of growth, the plant being of medium size and good height, with leaves set well apart on the stalk, and maturing well early in the season. All the Pryors are useful for stemming into strips, having a small and light stem and smooth leaf. The Little Hill has a rounded leaf, not very wide, of fine fiber, and ranks among the best varieties for stemming and for general purposes. The Orinoco is hardy in constitution and not liable to diseases of growth; is most valuable when grown on soils which develop oily consistency and heaviness of texture, making a grade suitable for the better German consumption. The Twist-bud makes a heavy yield, cures easily into bright or red colors, makes excellent plug-fillers, but is not fit for wrappers nor for making strips on account of its narrow leaf and heavy stem. Tennessee Red is coarse, and derives its value from its heavy weight. Long Green is largely grown by some on account of its weight. The leaf is coarse, of good length, but rather narrow, and when of sufficient length it is valuable for shipment to Africa.

Even in the same neighborhood, and upon similar soils, there is no attempt at the production of any uniform type. The multiplicity of varieties grown in a single neighborhood, and often upon one farm, has resulted in cross-fertilization, and a consequent production of variations. No valuable varieties can be expected from this miscellaneous inter-fertilization, and even the most careful attempts to that end would be difficult and uncertain amid such surroundings.

The best planters use much care in propagating the seed and preserving the purity of desirable kinds. Some frequently procure seed from other sections of the country, hoping in this way to produce a plant true to name.

GEOLOGY AND SOIL FORMATIONS.

The whole of this district lies within the western coal-basin. All the members of this formation are exposed upon the surface at one point or another of the district. In some places the sandstones appear; in others the shales, conglomerates, or carboniferous limestones are found near the surface in some localities; in others, some one of the coal measures is exposed, exhibiting within a narrow territory frequent and abrupt changes of surface configuration, and equally abrupt changes in the composition and character of the soils.

A feature of some uniformity in the geology of this district is the prevalence of salt-bearing sandstones, underlying almost its whole surface. All the soils are more or less saline, and in parts of Henderson and Hopkins counties this peculiarity is very marked.

There are also considerable deposits of iron ore, principally in Daviess, Muhlenburgh, and Hopkins counties. These ore deposits, when in any considerable body, lie at some depth below the surface, but throughout the section of country where iron ores exist the upper soil is more or less ferruginous.

The largest body of soil of uniform character is the alluvium of the streams, and is found chiefly in Daviess, Henderson, and Union counties, along the Ohio river. In the two latter counties this formation is large, and in Henderson county it is estimated to cover an area of 60,000 acres. McLean and Muhlenburgh counties have considerable tracts of alluvial soils along the line of Green river. These alluvials are very productive, the soil consisting of a very deep loam, overlying a solid red-clay subsoil. The growth of the forests is poplar, elm, sugar-tree, gum, etc., with an occasional undergrowth of cane.

A small area in Muhlenburgh county deserves special notice, because of the peculiar capacity of its soil. It consists of a narrow strip of land, extending outward from Green river, in some places so swampy as to be impenetrable, and supposed to have been at one time a part of the channel of the river. The prevailing growth is cypress, of which there are large and heavy forests still remaining. Such portions of this territory as could be made available were originally settled by a colony of Pennsylvania Germans, whose descendants still occupy the lands and continue the cultivation of tobacco. The soil is a dark loam on a subsoil of pale red clay. The tobacco produced here is of a thin, light texture, of a very delicate fiber, with a natural tendency to cure into bright colors. It is free from oil and gum, and the lighter part of the product has been much used for fine-cut chewing, and is radically different from types made upon similar soil formations elsewhere.

The better upland soils are mainly of sandstone derivation, modified by various outcroppings of the strata of the coal group, and consist of a dark mold, mixed with sand, on a subsoil of yellow clay. The growth consists of hickory, black oak, white oak, walnut, and a few poplars, with an undergrowth of dogwood, sassafras, and occasionally sumac. Upon rolling or broken lands this class of soils is liable to serious damage by washing, requiring constant watchfulness and good management to preserve them.

The soils derived from the outcroppings of shales and conglomerates are not very productive. They are usually gray in color, upon a subsoil of light yellow or blue clay. The conglomerate soils make a poor and starchy quality of tobacco, thin and harsh. The growth upon these lands consists of oaks and hickories, very few of which are large trees. Considerable areas of this class of lands are found in Muhlenburgh, Webster, and Hopkins counties. In Daviess county the ridge lands have a soil of sandy loam, upon a subsoil of rich yellow clay, with a forest growth of poplar, sweet gum, ash, white oak, and dogwood. These lands produce a tobacco of light body, delicate texture and fiber, which cures easily into bright colors, and on that account has been highly valued of late years.

Of the lands planted in tobacco in 1879 from one-third to one-half was such as is known as fresh land—land either cleared for the crop of that year, or not more than three years previously. In different localities the estimated proportion of forest land suitable for tobacco growing varies from 33 to 100 per cent. On the Quaternary formations almost the entire body of forest lands is adapted to the culture of tobacco, but upon the uplands the proportion is less than one-half.

Upon the whole, it is admitted that there has been a marked depreciation of fertility of the upland soils throughout the district. This is attributed to a very great extent to the surface washing to which most of the ridge and hill lands are liable. The river and creek bottoms, naturally very fertile, are generally so nearly level as not to wash easily, and do not show any falling off in productive capacity.

When the uplands are so far worn as to cease to produce crops which will pay for cultivation they are either abandoned and turned out or inclosed, so as to prevent cattle ranging upon them, and suffered to grow up in persimmons, sassafras, briars, and broom grass; in the latter case, they may be again brought under cultivation after the expiration of ten or fifteen years. If such lands are put down in clover before the exhaustion has gone so far as to make it impossible to get a fair catch restoration may be accomplished much more quickly. It is a common practice to follow tobacco with wheat seeded to clover. Sometimes rye follows tobacco, to be turned down early in the spring for either tobacco or corn, and sometimes the grasses are made to occupy two or more years in the rotation. A large number of farmers, however, do not make timely use of the necessary agencies for maintaining the fertility of their farms. The low market value of lands, and the large areas of forest soils adapted to tobacco culture, almost valueless until opened for cultivation, have been inducements to neglect the necessary care of the older fields and to rely upon the "new grounds" as the best to maintain the annual product.

While the planters of this district generally concur in the opinion that continuous culture of any given soil in tobacco will produce exhaustion, they do not admit that the crop is more exhaustive than many others. Good lands will make three profitable crops of tobacco, and it is doubted whether three successive crops of corn or wheat could be taken from the same class of lands without even greater exhaustion of fertility.

The yield per acre, so far as can be ascertained, has not materially decreased since 1870. Collating the returns made to the auditor of Kentucky for several years and the official returns of the recent census, it would appear that there has been no deterioration of soils if the "yield per acre" is conclusive evidence; but if it be kept in mind that the tobacco crop not only occupies the best of the old lands, but very nearly monopolizes those newly cleared, it may be concluded that much of the soil exhaustion everywhere evident in this district is chargeable to the culture of tobacco.

LABOR, WAGES, AND COST OF PRODUCTION.

A very considerable portion of the tobacco crop of this district is made by the labor of the proprietors themselves, with such assistance as can be rendered by members of their families and occasional help hired by the day or month.

Farm laborers, when hired by the year, are paid from \$100 to \$150, with board; employed by the month, from \$10 to \$15, with board; by the day, from 50 to 75 cents.

Tobacco lands in this district differ greatly in value—from \$5 to \$50 per acre—according to the productiveness of the soils, the character and quality of the average product, distance from market, etc. The average value of the better class of lands may be estimated at \$25, and of inferior lands at \$8 per acre. Lands capable of producing 1,000 pounds rent at from \$6 to \$8 per acre; but it is rarely the case that such lands are rented for money, the share system being more common. Lands producing with good culture an average of 500 pounds per acre rent at \$4 or \$5.

The following is an estimate of cost of tobacco grown upon the best lands:

Wages one man, six months	\$75
Board one man, at \$2 per week	52
Rent of 3 acres of land, at \$6	18
Feed of horse for two months	8
Use of wagon, implements, barn, etc.	15
	<hr/>
	168
	<hr/>

One hand cultivates 3 acres, making 3,000 pounds, worth 6 cents, \$180.

This shows a profit of only \$18 on the product made by one hand on 3 acres of first-class land, after estimating a full yield, and the crop, as sold, at a price somewhat above the average.

It is very difficult to estimate correctly the cost of raising tobacco in this district. If an account be kept of the actual cost of labor performed by man and team, the interest upon value of land, the depreciation in value of team, implements, etc., and a fair estimate of the cost of necessary repairs to barn, fixtures, etc., it will be found that the cost per pound of the cured product is not much less than 5 cents. At the average prices realized there is little profit in the business, and its economic value to the people of the district consists in the fact that it furnishes employment at fair wages for a very large proportion of the working population.

The estimated values of the several grades of the product of 1879 are: For trash 50 cents to \$1 per hundred; for lugs, \$2 to \$4; for leaf, \$4 to \$8. That portion of the crop sold to stemmers at Henderson realized an average price around of about \$4 35 per hundred pounds. This was mainly heavy shipping tobacco. The better and lighter product was sold at higher prices, making the average value of the crop of the district about \$5 per hundred.

Commercial fertilizers are used to a very limited extent, with favorable results generally reported. Farm-yard and stable manures are carefully saved, and are used by the better farmers almost exclusively upon the lands planted in tobacco.

The damage to the quality of the crop of 1879, attributable to various causes, was: From green cutting, 20 per cent.; house-burn, 20 per cent.; stem-rot, 12 per cent.; worm-eaten, 10 per cent. By house-burn and stem-rot the damage to this crop was exceptionally large.

In the following statement material for the first three years is obtained from official returns made to the auditor of Kentucky. The production and yield per acre for 1879 are derived from official returns made to the United States Census Bureau:

Years.	Production.	Acreage.	Yield per acre.	Value of crops in farmers' hands.	Value per pound.	Value per acre.
	<i>Pounds.</i>		<i>Pounds.</i>			
1876.....	33,887,528	46,741	725	\$2,202,080 32	6 50	\$47 12
1877.....	43,934,908	51,688	850	2,526,257 21	5 75	48 87
1878.....	26,439,603	40,676	650	1,454,178 16	5 50	35 75
1879.....	30,062,224	50,343	776	1,909,372 95	4 89	37 93

THE GREEN RIVER DISTRICT.

This district occupies a small area between the Upper and the Lower Green River districts. The surface of the country is much broken, a very small proportion of the lands being level or moderately rolling. The slackwater navigation of Green river and the Elizabethtown and Paducah railway furnish transportation at all seasons of the year.

The types grown, both of heavy and of light tobacco, are closely related to those of the Upper and the Lower Green River districts. The heavy tobaccos are coarser and less oily than those of the upper district, and less flexible, not so smooth, and of less absorptive capacity than those of the lower district. They are of coarse fiber and stem, stiff and starchy, and usually of narrow leaf. This is especially true of the product grown upon the Chester group of rocks. That grown upon the Quaternary soils has a larger and wider leaf, but is otherwise equally coarse and harsh. These heavy tobaccos, especially those grown in Butler county, are of lower quality than the related grades of the same type grown in adjoining districts, and the larger part of the product falls into the nondescript class. The light types are approximations to similar types of the two adjacent districts, having less delicacy of structure than those of the Upper, and less absorptive capacity than those of the Lower Green River country. These lighter types furnish a very small proportion of bright wrappers of common grade, a few packages of bright smokers, and a moderate amount of fillers for plug chewing.

Little attention has been paid to the selection of varieties. The characteristics of the crops of this territory are narrowness, coarseness, and roughness of leaf.

Green River district is occupied by two distinct geological formations: the Carboniferous and the Chester groups and the limestones of the Saint Louis group. Butler county is about equally divided between these two formations, while Ohio county lies more largely upon the Carboniferous, having a narrow belt of the Chester group upon its eastern border. In both of these counties there is a general thinning out and termination of the coal measures, while the Chester group appears with its alternating beds of sandstone, shale, and limestone.

Upon the Saint Louis limestones the soils consist of loose, light loam upon a subsoil of red clay; upon the Carboniferous formation are light-colored loams, resting upon a compact and tenacious yellow clay; and upon the Chester group are thin, grayish loams, upon a subsoil of blue clay. There are considerable areas of alluvial soils along the water-courses, consisting of deep, dark loams upon a foundation of red clay. The growth upon the alluvials is made up of heavy oaks, poplars, walnut, and elm; upon the Chester, white and red oaks; and upon the Carboniferous, mostly scrubby oak and hickory. The types grown upon the Carboniferous soils are of a light, delicate, and porous structure, of mild and sweet flavor, with very little gum and oils; upon the Chester they are stiff, harsh, and coarse, with somewhat more of gum and oils; and upon the Quaternary they are large and coarse, with a long and broad leaf of porous texture, heavy fiber and stem, and of strong and pungent flavor.

The surface overlying the Carboniferous system is much the largest in extent; that occupied by the Chester is the next in extent; the Quaternary is of limited area; and the Saint Louis so small as not to be worth estimating. Much of the soil of the district is very tender under cultivation, and is liable to severe damage by surface washing.

The proportion of lands abandoned as exhausted is small. Rotation of crops is not much practiced. The Carboniferous soils are easily tilled and produce freely, and on that account are more heavily taxed by continuous

cultivation than the limestone soils. It is the received opinion that both the quality and the quantity of the yearly product of tobacco have decreased during the past ten years to a material extent.

The values of lands in this district vary between wide limits. Low-grade lands, producing from 150 to 500 pounds of tobacco per acre, are worth from \$1 to \$5 an acre; lands of the best grade, capable of making 1,000 pounds, are worth from \$20 to \$25 per acre. The rental value of the best lands is \$5, and of the poorer lands from \$1 to \$2 per acre. Men employed by the year are paid from \$100 to \$120, with board, and day laborers get from 50 to 60 cents per day, with board, and 75 to 80 cents without board. The cost of barns, fixtures, implements, etc., does not vary from that of other districts in the state.

The following estimate is made of the cost of production on the best lands:

Rent of 2½ acres, at \$5.....	\$12 50
Wages and board, one man, three months.....	50 00
Cost of 10,000 plants, at 10 cents per hundred.....	10 00
Stripping, packing, and prizing.....	7 50
	<hr/> 80 00

Product, 2,500 pounds, worth \$5 per 100 pounds, \$125.

From this estimate are omitted interest upon cost of barns and fixtures, the use of team and feed for same, and cost of repairs to implements. Upon the low-grade lands it is said that "the tobacco crop would always bring the producer in debt if it were not made by the women and children, who would be otherwise unemployed".

The value of the crop of 1879 is estimated at \$4 50 for dark shipping; fillers, \$2 to \$4; bright wrappers and smokers, \$5 to \$8; cutting, \$5 to \$8; nondescript, \$2 to \$4. No prices are given for trash, lugs, and low leaf. The value of the crop round is estimated at 5 cents per pound.

In the following statement the production of the Green River district for the first three years is obtained from official reports to the auditor of Kentucky. For 1879 the weight of product, acreage, and yield per acre are derived from official returns to the United States Census Bureau, and the rest of the statement is estimated:

Year.	Production.	Acreage.	Yield per acre.	Value of crop.	Value per pound.	Value per acre.
	<i>Pounds.</i>		<i>Pounds.</i>		<i>Cents.</i>	
1876.....	4, 088, 414	7, 675	550	\$311, 775 87	6. 25	\$40 62
1877.....	7, 555, 405	9, 444	800	415, 550 57	5. 50	44 00
1878.....	3, 607, 082	6, 723	550	194, 128 30	5. 25	28 87
1879.....	4, 218, 028	6, 410	657	210, 901 40	5. 00	32 86

THE UPPER GREEN RIVER DISTRICT.

This district occupies a central position between the eastern and western boundaries of the state, and extends from the Tennessee line to within 25 or 30 miles of the Ohio river. Its surface is greatly diversified. Some portions of the district are covered with a growth of heavy timber; in other parts the forest is thin, and the trees are dwarfed and scrubby. It is well watered by Green and Barren rivers, both of which are navigable, and by numerous small streams. The Louisville and Nashville railway passes nearly through its center north and south, with branches from several points on the main line, affording, with the river navigation, abundant facilities for the shipment of its products. Tobacco employs a larger amount of capital and labor than any other farming industry.

TYPES OF TOBACCO PRODUCED.

In Green, Barren, Warren, Taylor, and to some extent in the other counties, is produced a type of heavy tobacco, rich, and oily, strong, elastic, and of fairly smooth structure, solid and firm. Being very flexible, it is desirable both for dark wrappers and for spinners. Some portions of this type possess the oils and weight of body necessary for the manufacture of snuff. It furnishes a portion of the export to Germany, the north of Europe, to Switzerland, and a limited amount goes to Canada. Some part of it is taken for the French and Italian Regie. The lowest grades are adapted for the Spanish Regie, and are also used for cutting into the cheaper smoking-tobaccos for domestic consumption.

In a small district of Hart and Barren counties are produced some excellent bright wrappers, of small and rather short leaf, very fine, and rather oily, and of a mild and delicate flavor. This type is thin and light in body and colored, but is of sufficient strength to be used as wrappers for plug chewing. The amount is very limited, and is estimated to be not more than one-twentieth of the general product of Hart county, where nearly all of it is grown. The lower grades and lugs of this type are used as plug fillers, and the better flavored of these grades for cutting into pipe-smoking tobacco. This line of types requires soils of peculiar character, with high culture and careful management in curing, and is made by a small class of planters, whose large experience in its production, aided by the employment of fixtures of the most approved construction, has brought them much personal reputation as well as profit.

A third type made in this district consists of a light and thin leaf of bright or red colors, formerly used to a large extent by manufacturers as fillers for plug tobacco. Deficient in gum and oils, it is of medium weight of body, and has neither the strength of texture nor high coloring to fit it for use as wrappers. It is not so firm in texture as the heavy types of this district, and has but moderate absorptive capacity. The special uses of this type are for fillers for plug chewing, and a very small proportion is fitted for bright wrappers when of sufficient smoothness, desired color, and strength. As now grown and cured this type supplies some of the brighter qualities required for German export, and a part of the heavier grades are adapted for the French Regie. Its absorptive capacity is too low for export to England. Recent changes in the tastes of consumers are bringing into use material of still lighter texture and body, and efforts are being made by planters to modify this type to suit the new demand. The lower grades are still largely used for common plug fillers, for cutting into a low grade of smoking-tobacco for home consumption, and for export to Germany, Belgium, Spain, and the Mediterranean ports. In Green county this type is estimated at 30 per cent. of the total product of tobacco, in Grayson at 25 per cent., and in Hart at 50 per cent. In Barren and Warren counties it is probably less than 30 per cent., and in Taylor, Allen, and Marion about 35 per cent.

In this district there is also produced a large bulk of nondescript. The lugs and trash of this class hold a much more definite position than the leaf of higher grades, are largely used for cutting into common smoking-tobacco for domestic consumption, and are exported to supply a foreign demand for the cheapest material. In Grayson county the proportion of nondescript is estimated at 40 per cent., in Hart county at 30 per cent., and the proportion is large in all parts of the district.

There has been some improvement in the quality of the general product within the past ten years. This is probably the result of better cultivation and more skillful curing and the adoption of better varieties, with a consequent diminution of nondescript grades, in which there has been a recognized deterioration of quality.

VARIETIES OF TOBACCO PRODUCED.

The principal varieties grown are the Blue and Yellow Pryor and Orinoco. Until recently a variety known as One-sucker was extensively planted, and Big Burley and Apron Leaf were at one time popular in certain sections. The first three above named have been found best adapted for the production of salable types.

The Yellow and Blue Pryor have nearly the same habits of growth, and make a product of very similar characteristics; but the leaf of the Yellow Pryor is somewhat more tapering at the point than that of the Blue Pryor. Both have a smooth and silky texture and good body, and a length and width of leaf suitable for all manufacturing purposes. With appropriate handling and curing these varieties, grown upon soils of diverse character, produce different kinds and qualities of leaf, adapted to various uses. When of sufficient weight and strength of texture, they make both dark and bright wrappers; when very oily and heavy, they are suitable for spinning and for grinding into fine grades of snuff; when of light body and bright color, they make fillers for plug chewing; and when of thin texture, with a good breadth of leaf, delicate fiber, elastic, and of a deep brown color, they are very useful for cigar wrappers. No other varieties have shown so wide a range of adaptation. The Yellow Pryor is preferred for making bright wrappers, because it is easily cured into a bright golden color.

The Orinoco is well adapted for spinning, and, when not too heavy, makes good wrappers. The close set of the leaves upon the stalk, and the heavy ruffling at the bases of the stems, are objectionable characteristics.

The Big Burley, Apron Leaf, and One-sucker are all coarse varieties. The One-sucker has a long, narrow leaf, erect instead of drooping, and is said to produce but one crop of suckers, for which reason it was at one time popular with those who desired quantity of product rather than quality. When of sufficient length of leaf, it is useful for packing into stock for the African trade, which is about its only adaptation. The same may be said of the other two varieties, which make a product of low grade.

GEOLOGY AND SOIL FORMATIONS.

This district lies almost entirely upon the sub-Carboniferous formation, and its soils differ as one or the other member of this system approaches the surface. The southeastern portion is based upon the lower member of the sub-Carboniferous limestone, which is composed of dark, earthy shales, with thin strata of limestone rocks. The central and most of the northwestern part lies upon the middle member of this system, technically called the barren limestone, much purer and more massive in its beddings than the rock of the lower stratum. On the western border of this district is a skirting of the Chester group of rocks, lying at the base of the Carboniferous and overlapping with a narrow margin the sub-Carboniferous limestone. In the northeastern portion the prevailing formations are limestones, with an exposure of sub-Carboniferous sandstone and shales. In Hart county the Carboniferous system approaches the surface, manifested by its strata of coal and the characteristic rocks of that formation.

The area occupied by the barren limestone forms much the larger part of the territory of this district. The soil is very nearly of a uniform character, consisting mainly of a light loam upon a deep red-clay foundation. On the broken surfaces it is much mixed with gravel, and is especially adapted to the production of rich and oily types of tobacco of heavy body and smooth texture. It is easily cultivated, naturally well drained, but rather

tender, and upon the slopes is subject to injury by rapid washing. Its red-clay subsoil gives to these lands great durability, makes them easily restored to fertility by manure or by proper rotations, and enables them to resist the effects of drought. The limestone upon which this body of soil is based contains many nodules of flint, and is very cherty in some localities, is of close texture, and disintegrates slowly. The soil is therefore slowly supplied with mineral fertilizers from this source, and must have periods of rest from tillage by well-considered rotations, in which clover and the grasses hold prominence, in order to maintain a given standard of productiveness.

The characteristic timber growth consists of red, black, and post oaks, and hickory of rather small size, with a prevailing undergrowth of hazel and dogwood. Where the growth of hickory is largest the soil is generally quick and productive, and makes a leaf of smooth and fine texture, fine fibered, and with a good supply of oils. The soils preferred are level or slightly-rolling surfaces of vegetable mold, or gravelly slopes of rather stiff consistency, with good depth. Under average conditions the yield varies from 600 to 1,000 pounds per acre, but the chief value of these soils consists more in the peculiar qualities of the tobacco produced upon them than in the weight per acre. By some it is believed that their capacity is declining. The deterioration of quality may be attributed, in some measure, to a succession of unfavorable seasons. For several years past there has been a general deficiency of strength and elasticity of texture and a smaller supply of oils. Most of the tobacco now produced is grown upon old lands, and these, when manured well, produce the heavier and more oily types. No large area of new lands suitable for tobacco culture is now available, and the proportion of the product derived from newly-cleared lands is annually decreasing. The constantly lessening proportion of such types accounts for the presumed deterioration in the quality of the general product.

In Green and Taylor counties there are considerable bodies of soil, known as "beech lands", which produce oily and heavy types of tobacco. These soils consist of a dark loam or vegetable mold, overlying a red-clay foundation of good depth. The prevailing tree growth is of red beech, mixed with walnut, sugar-tree, and hickory. Uplands, slightly rolling, are preferred, but the lowlands along the water-courses do well for tobacco, except in wet seasons, when the product is likely to be coarse and of inferior quality. These lands contain a larger proportion of chert in the limestone base and intermixed with the clay of the subsoil than those of the central area of the district already described, but their general productiveness, ease of tillage, liability to damage by surface washing, etc., are very nearly the same. The same methods for the maintenance or restoration of fertility are in common use, and are found effective. About one-half of the wooded lands of Green and Taylor counties is adapted to the production of tobacco; but, as elsewhere in the district, the proportion of the annual planting upon newly-cleared lands is decreasing.

In Hart county, and in a limited portion of the northwestern corner of Barren, is a distinct body of lands noted for the production of tobacco specially suited for bright wrappers. The soil is calcareo-siliceous, overlying the measures of the adjacent coal-fields, which here extend eastward in thin and irregular strata. The surface is ridgy; the soil thin, and of a mulatto color; the subsoil, compact yellow clay. The timber growth is scrubby hickory, white oak, post oak, black oak, chestnut, and chestnut oak. The soil contains much gravel and sand, and the subsoil is calcareous. The tobacco grown upon this soil is of light body, very fine and silky in texture and fiber, but so firm and compact as to possess especial value for wrappers. The soils preferred for making "Hart county bright wrappers" are freshly-cleared sandy uplands, with a timber growth of hickory, black-jack, and post oak and a sparse undergrowth of hazel. The yield, especially of the finer types, does not exceed 500 or 600 pounds per acre; but this moderate yield is more than compensated by the increased value per pound.

Outside of these three distinct soil formations the lands of this district are of uncertain adaptation for tobacco of well-defined character in market. The lighter types are sometimes available as plug fillers, and in rare instances for a low grade of wrappers; the heavier types have little usefulness for any purpose. The soils are of low value, not durable, and can be reclaimed only at a cost greater than their value.

VALUE OF THE CROP OF 1879.

The great variety of types of tobacco produced in this district, and the large proportion of nondescript, make it difficult to state accurately the average values of the crop. As nearly as can be ascertained, the average values may be estimated as follows: For nondescript, \$3; for lugs, \$4 25; light-body fillers, \$5; bright wrappers, \$15 per hundred pounds.

LABOR AND THE LABOR SYSTEM.

Laborers employed in tobacco culture are mostly colored, and are generally hired for the year at a stated rate of wages per annum, ranging from \$100 to \$150, with board or rations, to men of the best class. Some crops are grown on shares. Day laborers, men, are paid 50 cents per day, with board; without board, 75 cents. By the month men are paid from \$8 to \$11, with board. A large part of the crop of this district is made by the proprietors themselves, with the help of such members of their families as are able to work.

COST OF PRODUCTION.

Upon good soils, of fair productive capacity, the following result may be obtained under skillful management::

Cost of labor, one man, one year, with board.....	\$200 00
Wear and tear of implements and fixtures.....	20 00
Use of team, and feed for same.....	65 00
Rent of 15 acres wheat land, at \$2 50.....	37 50
Rent of 15 acres corn land, at \$3.....	45 00
Rent of 3 acres tobacco land, at \$6.....	18 00
	<hr/> 385 50 <hr/>
Average product of tobacco by one laborer, 2,000 pounds, at 5 cents.....	100 00
Average product of wheat, 200 bushels, at 75 cents.....	150 00
Average product of corn, 450 bushels, at 30 cents.....	135 00
	<hr/> 385 00 <hr/>

Results as favorable as those here estimated have been frequently obtained upon good lands with average seasons, but in far the greater number of instances the cost of producing tobacco must exceed 5 cents per pound. A large part of the lands of this district do not admit of raising a variety of crops in such amounts as to be profitable. On such lands the production of tobacco is maintained because the labor employed is that of the farmer and his family.

In the following statement the weight of product in the Upper Green River district for the first three years is obtained from official returns to the auditor of Kentucky. For 1879 the production, acreage, and yield per acre are obtained from the returns made to the United States Census Bureau. The rest of the statement is estimated:

Year.	Production.	Acreage.	Yield per acre.	Value of crop.	Value per pound.	Value per acre.
	<i>Pounds.</i>		<i>Pounds.</i>		<i>Cents.</i>	
1876.....	12,618,101	21,027	600.00	\$820,182 41	6.50	\$30 00
1877.....	24,311,137	33,448	727.00	1,458,068 22	6.00	43 61
1878.....	10,313,756	20,027	500.00	541,472 10	5.25	26 25
1879.....	11,992,597	17,676	678.46	500,620 85	5.00	33 92

THE CLARKSVILLE DISTRICT.

Tobacco culture in that part of the Clarksville tobacco district lying south of the Kentucky line is described in the chapter on Tennessee.

In Kentucky the territory is a wide and continuous water-shed, from which the drainage is carried into the Cumberland river by a number of small streams, with narrow channels and high, rocky banks. Its general surface is level, or rolling in long, low curves, with some small and narrow belts of broken country. The Cumberland river cuts through the western part of Trigg county, the Louisville and Memphis railway passes through Logan and Todd counties, the Saint Louis and Southeastern railway through Christian and Todd, and the Louisville and Nashville railway through Simpson county, affording good facilities for transportation.

There is much uniformity in type, and almost the entire product is characterized by heaviness and firmness of texture, strength and elasticity, oily consistency, and general smoothness of structure, with moderate delicacy of fiber and stem, and may be considered as one leading line of types.

By its peculiar permanent qualities the Clarksville product meets a very wide range of demands. Some of these are so established in character that in chapter II they have been described under the following types: Fine-fibered Clarksville Wrapper, Clarksville and Missouri dark and red, Italian Regie A and B, French types A and B, Austrian Regie, German Saucer, Snuff Leaf and Lugs, German Spinner, Swiss Wrapper, Dutch Saucer, Belgian Cutter, African Shippers, and Mexican Wrappers.

In the northern part of the district, on the line of juncture between the Saint Louis and the Carboniferous formations, is produced a type of light body, somewhat resembling the lighter types of the Lower Green River district. This to some extent is used for domestic manufacturing purposes, as fillers, but it is of low grade.

The richest and most oily lugs are used in the United States for grinding into common snuff; the leafy lugs, of less weight of body, are used for cutting into common smoking-tobacco. In Germany the former grade is used for fillers in spinning, and in both Germany and Spain for the manufacture of common snuff; the latter grade is used in France, Spain, and Italy for binders and fillers for common cigars, and those of least substance and of fair quality for granulation for fillers for cigarettes. Decayed or damaged lugs are used for sheep-wash.

The tobacco product of this district has a wider range of adaptation to purposes of a high grade than that of any other section of the state, as it is susceptible of being cured into such diversity of color.

During the past ten years marked changes in the quality of the general product have taken place. In Todd

county the proportion of dark shipping in 1879 is reported to have decreased considerably. In Christian county the following estimate is made: Dark shipping, 40 per cent. in 1879, 25 per cent. in 1869; fillers, 25 per cent. in 1879, 25 per cent. in 1869; cigar leaf, 5 per cent. in 1879, 10 per cent. in 1869; bright wrappers and smokers, none in 1879, 25 per cent. in 1869; nondescript, 30 per cent. in 1879, 15 per cent. in 1869. It is claimed, however, that this estimate is for a given locality, and does not fairly represent the product of the whole county.

The only improvement is reported from Trigg county, where the product is said to be heavier and cleaner and the general quality somewhat better than ten years ago. Dealers who have handled the crops of this district for the past ten years agree in opinion that there has been a marked decline in the general standard of quality, and it is a recognized fact that the average deterioration of quality has been more marked than in most of the other districts of the state, amounting in Logan and Christian counties to from 10 to 25 per cent.

GEOLOGY AND SOIL FORMATIONS.

The whole surface of this district is situated upon the Saint Louis group of rocks belonging to the sub-Carboniferous formation (and mostly upon the cavernous member of this group), with the exception of a narrow belt of the Keokuk group on its southern and western border and of coal-bearing strata upon its northern line. The western half of Trigg and the southeastern part of Simpson lie upon the Keokuk group, which also underlies a narrow strip on the southern lines of Logan, Todd, and Christian counties. The northern parts of Todd and Christian counties are situated upon the Carboniferous, and the hills in the northern part of Logan are capped with members of the Chester group.

The soils of this district, having these diverse sources of formation, vary in character and capacity. Wherever situated upon the Saint Louis group, a deep bed of clay rests upon the underlying rock, overlaid by a surface soil, in some places of a very deep-red color, and in others a light or pale red. The darker soils are lighter and of looser texture than the light-colored soils, and are of superior fertility. The lands on this formation are covered with a timber growth of black-jack, red oak, post oak, hickory, and gums of small size, with an undergrowth of hazel and dogwood. Originally very fertile, these soils have maintained the production of tobacco of superior excellence until recently.

The soils lying upon the Keokuk group are rather stiff and compact upon a foundation of pale-red clay. They cover a surface of gravelly and cherty ridges, and the prevailing tree growth is of large size, consisting mostly of red oak, with a few poplars (*Liriodendron tulipifera*), white oaks, elms, and gums, with an undergrowth of dogwood. Tobacco grown upon these soils has less breadth of leaf, less fatness and oils, not so much strength and elasticity, is not so heavy, and has less tendency to cure into full dark and brown colors than that grown upon the Saint Louis group. The frame (stem and fibers) of the leaf is coarser in proportion to the weight and body of web with which it is filled.

There are in Christian county three distinct bodies of land upon the Saint Louis group, producing three distinct qualities of tobacco. One of these is a rich and strong barren soil, with a scrubby growth of black, red, and post oak and hickory, upon which is made an oily and fat tobacco of very heavy texture, well suited to the higher grades of German demand. Another consists of a small area of level land, somewhat lower than the general surface, inclined to be marshy and wet, with a soil of dark color upon a foundation of stiff and tenacious yellow clay, producing a leaf of rather light weight, very silky, of delicate fiber, and specially fitted for use as Swiss wrappers. The third consists of an area of ridgy surface, with a soil of a grayish-brown color upon a subsoil of red clay, and with a timber growth of black and red oaks and scattering poplars, walnut, and hickory. This soil is sandy, and lies upon a margin adjacent to the coal-bearing strata. Its product is specially adapted for dark wrappers.

The type of tobacco for which this district is particularly noted is grown in highest perfection upon the soils of the eastern part of Trigg and the southern part of Christian, Todd, and Logan counties, where the original growth seems to have been a dense covering of barren grass (*Andropogon scoparius* and *A. furcatus*), succeeded by hazel.

In the eastern part of Logan and in Simpson county the peculiar characteristics of the type are lost to a large extent in a product of coarser quality, with less supply of oils and fatness. Here the soils are more compact, of a pale brown or darker color, upon a subsoil of no great depth above the bed-rock. These soils are more siliceous than those with which they are compared, nor have they the full red color which distinguishes the best tobacco soils of Christian and other counties.

There are some areas of Quaternary along the water-lines of this district very little used for the culture of tobacco. When grown upon such soils the product is very coarse.

The marginal areas in this district lying upon the Chester and Carboniferous groups are small and unimportant, and the types of tobacco produced upon them are scarcely recognized as a part of the crop of the Clarksville district.

The best lands are always selected for the growth of tobacco, the older lands being kept in permanent lots for this purpose and maintained in fertility by manuring and a system of rotation. Where available, small additions of freshly-cleared land are added to the tobacco-fields every year. The proportion of new lands is, however, steadily decreasing. In Christian county one acre of fresh land to fifty of old land is cultivated each year. In Logan county one-fifth of the land devoted to tobacco culture is estimated as fresh land; that is, such land as has been cleared but a few years, and is capable of producing a fair yield without manures.

Of the wooded lands of Trigg county 60 per cent. are adapted to the growth of tobacco; of Todd county, 90 per cent.; of Christian county, 80 per cent.; and of Logan county, 60 per cent. The forest area of the best tobacco lands of this district is already so much reduced that no considerable acreage of "new ground" is now available without such destruction of timber as could be justified only by absolute necessity. It is estimated that the average production per acre is 10 per cent. less than for the decade ending with 1869. This holds good for all the other cultivated crops, as well as for tobacco.

In only two counties, Christian and Logan, is any estimate made of the proportion of tobacco lands exhausted and turned out as old fields; in these counties it is stated as not exceeding 1 per cent. Land so turned out grows up quickly in briers, broom grass, sassafras, and persimmon, and is within a very few years restored to fair productiveness.

The methods adopted for maintaining fertility are much the same as those in use throughout the state. On level lands tobacco occupies a given field one year, followed by wheat, seeded to clover, the clover turned down in the fall of the third year, and the land manured for tobacco, to be planted in the fourth year. This plan, with the liberal use of manure, has proved quite successful. Some farmers have recently attempted to grow two crops of wheat, alternating with tobacco every third year, but the result was not satisfactory. Careful observers, especially those who have long occupied the better lands overlying the Saint Louis group, are of opinion that tobacco should not be grown upon the same soils at shorter intervals than four years, and that the best rotation is as follows: First year, tobacco, manured, the field sown in wheat in the fall of the same year; second year, clover, seeded upon the young wheat, lightly pastured in the fall; third year, clover for mowing, and to be pastured off only in dry weather; fourth year, clover, turned down in the fall, to be prepared in the spring for tobacco. Upon good soils some planters have succeeded in growing fair crops of tobacco year after year upon the same fields by seeding to rye in the fall, to be plowed under about the first of May. Stock pease are much used for green manuring, and are especially valuable upon the lighter uplands. Bone-dust, land plaster, and some of the more prominent commercial fertilizers, are used, but to a very limited extent.

VARIETIES OF TOBACCO PRODUCED.

Beside the varieties already described in the reports upon adjoining districts there are some of much local reputation. The Burt makes a very large plant, coarse in stem, fiber, and web of leaf, ripens imperfectly, and when of sufficient length is suitable for African shippers. The Clardy and the Thickset are described among the Varieties, chapter II, pages 23, 24. The Morrow, which is a very old variety, makes a plant of full size. The leaf is of good length and width, terminating very abruptly at the lower end, heavy, but rather coarse in stem and fiber, and makes good German shippers when not too coarse. It is difficult to cure, and is consequently liable to house-burn; ripens slowly, and is not easily "wormed", because of the heavy ruffling upon the stalks and leaf stems. The Vick makes a large plant, and has a narrow, bony, but heavy and thick leaf. The cured leaf is deficient in flexibility, is of no decided character or quality, having no ruffling upon the stalk or stem, and is preferred for that reason, and because it makes good yield of weight. The Tally is a local variety very similar to the Vick. The Little Yellow makes a large plant, and has leaves of full length, but somewhat narrow, set well apart on the stalk, with very little ruffle. The texture is heavy, with a moderately delicate stem and fiber, and makes good yield of weight. The plant is not hardy, and is liable to field-fire and "speck". When not too heavy bodied or too narrow in leaf the Little Yellow makes good Swiss wrappers; when sufficiently heavy and well cured it fills a portion of the Austrian demand. It is thought to be produced by cross-fertilization, as are also the Clardy and Burt varieties.

The Orinoco, Blue and Yellow Pryors, and Beat-all, or Williams, are also grown in this district, and are generally preferred. The high prices prevailing during the period of general inflation induced many planters to seek the largest yield without reference to quality, resulting in diverse cross-fertilizations, and the consequent loss of distinctive and characteristic varieties. Efforts are now made to reduce the number of varieties. Limited experiments have been made in growing the White Burley, but with indifferent success. The two types made by the White Burley and the heavy product of this district differ so widely that they cannot probably be profitably grown in the same territory.

COST OF LABOR AND PRODUCTION.

The labor system is very similar to that of other tobacco-growing districts of the state, except that a larger proportion of the crop is made by hired labor. When tobacco is grown on the share system the employer furnishes land, team, implements, barn, and fixtures, with house and fuel for the laborer and his family, and gives the laborer one-half of the product. Wage hands are paid an average of \$125 per annum, with board.

Barns cost from \$50 to \$300, with capacity for curing and storing from 2,000 to 15,000 pounds; annual cost for repairs, about 5 per cent. Tobacco-sticks cost from \$3 to \$4 per 1,000; one-horse plows, cost \$5; breaking plows, \$12; harrows, from \$5 to \$15; hoes, from 75 cents to \$1, with an average annual depreciation of value on all implements of 10 per cent.

The best lands in farms are worth \$50 per acre, with a rental value of \$6 per acre for tobacco lands producing an average of 900 pounds, and the lowest grades of lands are valued at \$10 per acre, with a rental value of \$2 for such as are capable of producing 400 pounds per acre.

The following is an estimate of the cost of production, under average conditions, with good management:

Wages of one man and board	\$200 00
Use of team and feed	65 00
Rent of 3 acres of tobacco land, at \$6	18 00
Rent of 15 acres of wheat land, at \$2 50	37 50
Rent of 15 acres of corn land, at \$3	45 00
Wear of implements and fixtures	10 00
Total cost	375 50
2,000 pounds of tobacco, at 5½ cents	\$110 00
180 bushels of wheat, at 75 cents	135 00
450 bushels of corn, at 30 cents	135 50
Total value of product	380 50

VALUE OF THE CROP OF 1879.

The average value of this crop in farmers' hands did not exceed 5½ cents per pound, and it is probable that a close estimate of net proceeds, clear of cost for casks and conveyance to market, would not show a value much, if any, over 5 cents. The following is given as the estimate of an experienced dealer, made after the crop had been almost entirely sold, the prices being based upon sales made in the Hopkinsville market: Best grades for baling and Swiss wrappers, 10 to 13 cents; good German types of leaf, 6½ to 10 cents; Regie leaf, 4½ to 6½ cents; good lugs, 3½ to 4½ cents; common lugs, 3 to 3½ cents per pound.

The weight of product in the Clarksville district for the first three years is obtained for the statement below from official returns made to the auditor of Kentucky. For 1879 the weight of product, acreage, and yield per acre are derived from returns made to the United States Census Bureau:

Year.	Production.	Acreage.	Yield per acre.	Value of crop.	Value per pound.	Value per acre.
	<i>Pounds.</i>		<i>Pounds.</i>		<i>Cents.</i>	
1876.....	10,000,747	16,607	600.00	\$750,050	7.50	\$45 00
1877.....	33,888,803	30,860	850.00	2,202,772	6.50	55 25
1878.....	18,111,010	27,832	650.72	906,106	5.50	35 70
1879.....	81,761,180	45,750	604.14	1,746,895	5.50	38 18

THE CUMBERLAND RIVER DISTRICT.

This district is situated in the southeastern part of the state, and is bounded on the south by the Tennessee line, west and north by the Upper Green River district, and east by the eastern coal-fields.

Most of the surface is very broken, with an occasional small body of level or rolling lands. Its eastern half, lying near the base of the Cumberland mountains, is penetrated by spurs of this range, and is very rugged, while the remainder is cut into sections of hilly and rolling lands. The Cumberland river passes through it from northeast to southwest, and on either side tributary streams have cut the face of the country into deep and narrow valleys, separated from each other by a very broken and elevated country.

TYPES OF TOBACCO PRODUCED.

The heavy types of tobacco are produced mostly upon low or bottom lands, and are rather coarse in fiber and stem, rough, wanting in flexibility, deficient in oils, but of good weight. In parts of Adair and Metcalfe counties a type of heavy tobacco is grown possessing smoothness, delicacy of fiber and texture, with a good supply of oils. This is grown upon fertile uplands, and is very similar to the better styles of heavy tobacco grown in the Upper Green River district. The light types are of fine fiber, light texture, and bright and red colors, and approximate similar types grown in adjoining districts. Some portion of this product has found use as bright wrappers and fillers for domestic manufacturing, for cutting into fine-cut chewing, and for the better grades of smoking tobacco. The more progressive farmers have been successfully endeavoring within four or five years to improve the quality of the product, especially of the lighter types, by a careful selection of appropriate varieties and the adoption of improved methods of curing.

Only three counties of this district furnish estimates of the proportion of different types produced. These estimates are as follows for the crop of 1879:

County.	Dark shipping.	Fillers.	Bright wrappers and smokers.	Cutting.	Nondescript.
	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
Cumberland	50	10	10	.....	30
Metcalfe	25	25	10	5	35
Monroe.....	75	20	.....	5	.....

These estimates being for but a small portion of the district cannot be taken as a reliable basis upon which to estimate the character of the entire product.

VARIETIES OF TOBACCO GROWN.

These are Blue and Yellow Pryor, Orinoco, Twist-bud, One-sucker, Shoestring, Poor Man's Friend, Long Green, Morrow, Silk Leaf, and White Burley. The Pryors and Orinoco are preferred. The Shoestring makes a very long, narrow leaf, with heavy stem and fiber, and is of very full but coarse texture, but is of no special value except for making African shippers. The One-sucker, Poor Man's Friend, and Long Green are very similar in habits of growth and in quality of cured product, and are valuable only because of the ease with which they are cultivated and prepared for market. The crop of White Burley for 1879 was so small as not to attract attention.

GEOLOGY AND SOIL FORMATIONS.

The whole of this district, except a small belt along its eastern margin, is situated upon the sub-Carboniferous formation. On its eastern border the coal-measure shale and sandstone of the eastern coal-field crop out and form a small body of characteristic soils, covering about half the area of Wayne county and a small section in Clinton. The remainder of the territory of these two counties lies upon the Saint Louis limestone, and has the surface features usually marking the presence of this group—rolling surface lines, numerous broad basins, sink-holes, and a scrubby growth of oak and hickory. As is the case with similar geological levels in the Clarksville and Upper Green River districts, it is supposed to have been at no very remote period a continuous prairie, covered with a rank growth of barren grass.

Throughout the remainder of this district various strata appear in the surface formations, exposing in one place or another almost every member of the sub-Carboniferous groups. In Casey county the Upper Silurian exposes formations of magnesian limestone, the Devonian, with its black shales, and the Lower Silurian in small belts of blue limestone. In Adair county the lower members of the Saint Louis group predominate, exhibiting earthy and shaly limestones and frequent outcroppings of red or gray shales, with occasional exposures of sub-Carboniferous sandstone. The rugged surface of Cumberland county exposes a succession of cherty limestones of the Saint Louis group and of black, gray, and green shales, as members of separate sub-Carboniferous strata.

The lithological features of Monroe and Metcalfe counties consist mainly of heavy masses of red and green shales, lying upon a thin bedding of black shale, and covered by formations of impure and shaly limestones, underlying beds of chert, mixed with red clay. Upon the slopes of a high ridge passing through these counties these heavy beddings of shale are exposed, capped with the limestones and overlying chert above noted. The geological features of Metcalfe, Monroe, and Cumberland counties have this characteristic in common: the deepest cuts of the streams expose the upper members of the Lower Silurian, while upon the hills are found the shales and limestones of the sub-Carboniferous formation.

With such diversity of origin the soils of this district differ very much in character and productive capacity. In Monroe, Metcalfe, Wayne, Clinton, and Adair counties are found bodies of land upon which the forest growth is mainly of poplar, beech, and buckeye, producing a heavy type of tobacco of delicate stem and fiber, of smooth texture, good weight, and a fair supply of oils and gum. These lands lie upon a red-clay foundation of from 6 to 10 feet in depth.

Beds of Quaternary along the water-lines, composed of a very deep loam, mixed with vegetable mold, upon a subsoil of red clay, are covered with a tree growth of beech, sugar-tree, walnut, and elm. These soils produce a heavy, coarse tobacco, rather porous in texture, and generally rough.

Upon the sub-Carboniferous sandstones the soils are stiff, clayey loams of a mulatto color, upon a subsoil of yellow clay 3 to 6 feet in depth, with a timber growth of white oak, hickory, and chestnut. Upon these lands the product of tobacco is light, of fine fiber, of delicate and silky texture, mild and sweet in flavor, and with a tendency to cure into bright and yellow colors.

Lying upon and derived from the shales are soils consisting of dark, coarse, and loose loam, upon a subsoil of dark or bluish material 1 to 4 feet in depth, and covered with a forest growth of post oak, hickory, and elm. These soils produce a plant of full size, with long and broad leaves, of medium weight, almost destitute of oils or gum, rather porous in structure, and having a tendency to cure into red colors.

The proportion of new lands occupied in tobacco culture varies in different localities from 10 to 75 per cent., the term "new" lands being taken to represent such as are not yet so much exhausted as not to produce successively fair crops of tobacco.

Of the wooded lands, from 75 to 100 per cent. are adapted to the production of tobacco. This estimate does not include such areas as cannot be made available for tillage of any kind, such as very steep or rocky hillsides.

All reports from this district agree that under tobacco culture the lands are declining in productiveness. This is a result not attributable to exhaustion of plant food by the growth of crops, but to surface washing. The broken and uneven surfaces of most fields are rapidly scoured away by heavy rainfalls, and large areas are consequently regarded as "worn out". To maintain the production of tobacco fresh lands have been cleared, and the process has been repeated until not much more timber land remains than is required for economic purposes. Most of the forest

lands are so broken and thin in soil that, although they might produce several crops of tobacco while fresh, they would soon become exhausted and comparatively worthless. It is probable, therefore, that the highest limit of production has been reached, and that tobacco culture in this district will scarcely retain its present importance.

The decrease of yield per acre is variously reported. In some localities it is stated as high as 25 per cent., as compared with the yield of the decade ending with 1869; in others, from 10 to 20 per cent. A corresponding deterioration of quality is reported, especially in the heavier types, which have lost largely in weight and firmness of texture.

COST OF LABOR AND PRODUCTION.

The labor system is much the same as in other parts of the state. Men receive from \$75 to \$120 per annum when employed by the year, with board; by the day, 40 to 75 cents, with board. When crops are grown on the share system, the laborer gets one-half, the employer furnishing necessary team, implements, etc. Barns and fixtures for storing and curing cost from \$75 to \$400.

The best lands in farms are worth from \$15 to \$50 per acre, producing 800 to 1,200 pounds of tobacco per acre, with a rental value of \$4 to \$6. Inferior lands are valued at \$5 to \$10 per acre, producing 400 to 800 pounds, and are rented at \$2 per acre.

The cost of production varies between $4\frac{1}{2}$ and 8 cents per pound, the latter being the cost upon inferior lands. There is general complaint that the culture of tobacco brings little or no profit. It would probably be abandoned in a great measure but for the fact that it furnishes employment for many workers, who cannot undertake the heavier labors of the farm.

VALUE OF THE CROP OF 1879.

Bright wrappers were sold at 10 to 25 cents, the smaller quantity bringing the larger price; good shipping leaf, 6 to 8 cents; common leaf, 5 cents; and lugs, $2\frac{1}{2}$ to 3 cents. The value of the crop round in primary markets may be fairly estimated at 5 cents per pound.

In the following table the weight of product in the Cumberland River district for the first three years is obtained from official returns to the auditor of Kentucky. For 1879 the weight of product, acreage, and yield per acre are derived from the official returns made to the United States Census Bureau. The remainder of the statement is estimated:

Years.	Production.	Acreage.	Yield per acre.	Value of crop.	Value per pound.	Value per acre.
	<i>Pounds.</i>		<i>Pounds.</i>		<i>Cents.</i>	
1876.....	4,390,737	7,333	600.00	\$263,084	6.00	\$36 00
1877.....	7,472,810	10,807	725.00	410,977	5.50	39 87
1878.....	3,204,084	6,408	500.00	100,204	5.00	25 00
1879.....	2,441,642	3,844	635.16	118,904	4.85	31 76

CULTURE AND CURING OF TOBACCO IN THE SHIPPING DISTRICTS OF KENTUCKY.

The methods of culture and the processes of curing tobacco in the seven districts of Kentucky already described have no peculiarities not common to them all. This part of the report is therefore made applicable to the whole tobacco region of the state, except the district in which the White Burley is the principal variety grown. The character of the product of this new variety differs materially from that of any other, and the manner of cultivation, handling and curing of the crop, varies in many particulars from the methods practiced in producing the types grown in the other districts of the state. For these reasons it is thought best to conclude the account of what may be properly called the shipping districts of Kentucky, treating separately the White Burley district.

PREPARATION OF THE SOIL FOR PLANTING.

It is the practice of good planters to break the land intended for tobacco as deeply as possible and as early in the fall as practicable. It is regarded as of prime importance to complete the breaking of deep and stiff clay soils before the colder period of winter. Soils of shale and sandstone derivation do not so imperatively require fall or winter plowing, nor is it necessary that they must be worked to such depth as is essential for those based upon the limestone formations; but even with the deepest and most friable of the siliceous soils there are advantages to be gained by early breaking.

Whatever the character of the surface or subsoil, it is important that all vegetable matter shall be turned under in time to become thoroughly rotted before the final preparation for planting is begun, not only to secure the utmost value of such material, both as a fertilizer and as a mechanical amendment to the soil, but that it shall be so entirely decomposed as to offer no impediment to subsequent processes of culture. In many instances, where stubble, weeds, or grass cover the intended tobacco-field, if the breaking is deferred until February, or later, it is

necessary to burn over the land, so that clean and satisfactory work may be done with the plow. Although it may be claimed that the ashes of the burned weeds or stubble return to the soil all the fertilizing constituents of real value, experience has demonstrated that the mechanical effects of slow fermentation and decomposition in the soil make the fibrous material of straw, dry grass, and weeds of much greater manurial value than that of several times the equivalent in ashes.

Upon the heavier lands, and especially upon those having a stiff clay subsoil, plows of steel or of chilled cast iron, drawn by two or three and sometimes by four horses, are used in breaking. The deeper the plowing the more satisfactory is this first preparation for tobacco, the depth being limited only by the capacity of the implement and the strength of the team. Good farmers are careful that not too much of the clay subsoil shall be turned uppermost, and that the deepening of the tillable surface shall be accomplished by gradually increasing the depth of culture year after year.

Upon the lighter lands, such as are found in the Lower Green River district, and upon the sandy soils and light alluvials throughout the state, the ground is not broken so deeply, usually from 3 to 4 inches only, and the work is rarely done until spring.

After the soil has been broken, it remains untouched until the season for planting approaches. The preparation for planting is so timed that the plants, as soon as ready, may be set in freshly-worked soil.

If manures are to be applied broadcast, as is usually the case with the coarse and imperfectly decomposed accumulations of the stable and farm-yard, they are hauled upon the land in February, or later, when the soil is dry enough to permit such work, and scattered as evenly as possible. The plow usually follows closely, turning under the manure with as little delay as practicable.

One rebreaking is generally thought sufficient, and if further preliminary work is necessary it is done with the harrow. If still cloddy and not properly fined, the field is rolled and again harrowed, or the surface is dragged with a heavy log, sometimes with two or more logs in a gang, and finally harrowed.

The preparation of newly-cleared land differs only in the manner of breaking. After the timber has been removed, brush, trash, and leaves are piled or raked into heaps and burned, clearing the surface as nicely as possible of all obstructions. The plow used for breaking is known as a "jumping coulter". This implement consists of a heavy iron or steel shovel, firmly bolted to a very strong frame or "stock". In front of the shovel, and in line with its center, is fixed into the beam a strong blade of steel, or iron laid with steel, sharp upon the front edge and rounding backward at the lower end. The blade extends downward, so that the point stands just in front of the shovel, and at an equal depth. The implement is built strongly throughout, so that it may be used with a stout team of mules or horses. Roots of considerable size are easily cut by the blade, and are torn up and thrown to the surface by the shovel. If large roots are encountered, the backward curve of the blade allows it to slide over the obstruction, and the plow is not impeded in its work. After the ground is plowed and cross-plowed in this manner it is repeatedly harrowed, and the roots are gathered up and removed; it is then plowed with the jumping coulter, harrowed, and the remaining roots picked off. The land is then ready for final preparation.

Both the row and the check system of cultivation are practiced, but the latter plan is the one adopted in all cases where the shape of the field or the lay of the land does not make it impracticable or unadvisable. The width between the rows and the distances between the plants are varied to suit the character of the soil, the variety of tobacco to be planted, and the type to be produced. Upon lands in fair condition 3½ feet each way is the ordinary distance. If it is intended to make a type of heavy weight, strong texture, and fat body, the distance between the hills must be great enough to admit of long-continued tillage. Recently a standard of 4 feet each way has been adopted by some good farmers with excellent results. A larger amount of food available for each plant, the free access of sunlight and air, and greater ease and thoroughness in the later cultivations, with less bruising and breaking of the leaves in the operations of topping, suckering, and worming, are all secured by the wider setting. It has been found that the total yield per acre is quite as large as when the plants are more crowded, and that the product is of better grade, because of better development in size, strength, and quality of leaf.

The field is marked each way, usually with a shovel or bull-tongue plow. An expert plowman can work from six to eight acres one way in ten hours, setting his stakes as he goes. When but one man is marking off, the stake rows are run at double width, and he "splits the middle" at each back furrow; when two men are at work, the most expert runs the stake rows at four widths, and "splits the big middle" by the return furrow, the helper splitting the "little middles", after a little practice, very accurately. The field is then marked in the same way at right angles, and is ready for hilling.

Manure is applied in the hill to some extent, but this is tedious and expensive. A given quantity of manure will go over a much larger area, and, if thoroughly decomposed and fine, will increase the yield in favorable seasons two or three times as much as the same quantity applied broadcast. Evil results are apt to follow the use of coarse and badly-rotted manure in the hill, especially if dry weather should occur before the plants are well rooted. A pint of leached ashes or a moderate shovelful of rich and well-rotted stable manure dropped in the check is applied with good effect. The hill is made with the hand-hoe, covering the manure to a depth of 6 or 8 inches.

It is essential that manures used in the hill shall be buried deep enough not to be dried by an ordinary season of drought, lest the plant be too much stimulated at first and thereafter almost entirely deprived of nourishment.

Spot and field-fire are almost certain to show themselves in fields where unfit material has been used for manuring in the hill, or where the best material has been injudiciously applied.

Commercial fertilizers are used to a very limited extent, and almost always in the hills, the quantity varying from a heaping teaspoonful to a tablespoonful for each plant. Opinions differ as to the effect of these fertilizers. In some instances more weight and a better quality of product have been obtained by their use, but in the large majority of cases no apparent benefit has been derived, either because used in too small quantities, or because they were adapted neither to the deficiencies of the soil nor to the demands of the tobacco plant.

Upon new lands manures are seldom applied, but their use is as decidedly favorable as upon old lands, and always proves a profitable expenditure.

In the heavy tobacco districts about one-half of the land planted in tobacco is manured in one way or another. Ordinarily the final preparation of the soil to receive the plants is made with the plow. A "list" is made upon the marking furrows by running a one-horse turn-plow on each side, throwing the earth together into a narrow bed. Furrows are then turned at right angles to the ridges. The tops of the latter are then cut off with the hoe, and the exact position for the plant is marked by clapping the earth, thus firming the surface and fitting it for the operation of planting. When the soil has been thoroughly pulverized this method is rapid, economical, and as perfect as can be desired.

If the land is cloddy and not well fined, it is necessary to make the hills with the hoe, breaking the clods and chopping the earth closely and drawing up the soil upon one end of the cut ridge, the hill being raised a little above the general surface.

Not unfrequently the tobacco plants are set in the loose earth at the crossings of the marking furrows without other preparation. It is claimed that by this method the plants are more likely to survive, because better protected from the drying winds and the heat of the sun, and because the roots are less likely to suffer for want of needed moisture. The early cultivation of plants set in this way is not so conveniently done, however, and the method is of questionable economy, except when circumstances require a resort to it to save a "season", (a) or for want of time to make more thorough preparation.

The land being made ready, and the plants of proper size, the first sufficient rainfall puts the ground in condition for planting. The most careful hands are set to work to draw the plants from the bed, only such as are strong and well developed being taken, and these are bruised as little as possible. The drawing is so managed as not unnecessarily to disturb the surface of the bed, so as to leave the remaining plants in the best condition for thrifty growth. The plants are carried to the field in baskets. A man or boy, with a basket, goes in advance, dropping a plant upon each hill of two rows. Two planters follow, each upon his own row. A smooth, round stick, 12 inches long, $1\frac{1}{2}$ or 2 inches in diameter, and pointed, is carried in the right hand, with which the planter makes a hole of proper depth; the plant is then placed in position with the left hand, and the soil pressed closely about the roots by a thrust of the stick on one side of the hole. The farmer frequently tests the thoroughness of the work by catching the tip of a leaf of the newly-set plant between the forefinger and the thumb, and if the soil has been sufficiently compacted about the roots the tip of the leaf will break off, leaving the plant in place, but if it is pulled up in this way it is evidence of imperfect work. Good planting is very essential to insure a quick start and a perfect and uniform stand. The earlier cultivation can only be successfully managed when the plants are as nearly as possible of uniform size and every hill is occupied.

If replanting is necessary, it is done at the first opportunity, always using large and vigorous plants. If the cut-worm kills a plant, the destroyer must be found before setting another plant, or the work may have to be repeated more than once. Grasshoppers sometimes attack newly-set plants, feeding upon the partially wilted leaves, and frequently eat out the bud. The field is inspected daily, so that the presence of insect enemies may be known and proper precautions taken to protect the plants. Vacancies are supplied as quickly as possible, and every effort is made to get an even start over the whole field. The early plantings make the better yield and quality of product.

CULTIVATION OF TOBACCO.

As soon as the plants are established in their new position cultivation is commenced. Usually a one-horse turn-plow is run close to the plant row on each side, throwing the soil from the plants. This is called "barring off", a term in common use in tobacco and cotton culture to describe the operation of turning the soil away from the plant row. When nicely done, this leaves the plants standing upon a narrow strip of undisturbed soil, easily and rapidly cleaned of grass or weeds by the hoe hands, who follow the plow. The soil displaced by the turn-plow covers up and destroys the grass and weeds which have started in the "balks" or middles of the rows. If the middles are free of grass, a single or double shovel is sometimes preferred for the first cultivation, and the work is certainly of superior efficacy when this implement can be used.

The first cultivation completed, a second is immediately begun, barring off the rows at right angles to the first plowing with the turn-plow or with the double shovel. No hoe work is necessary, unless the plowing has been so long delayed as to permit the weeds to get a start.

a A "season", in the vocabulary of the tobacco planter, means such a degree of moisture in the soil that the plants may be removed from the seed-beds to the field without endangering their vitality in transplanting. The word is also used when there is humidity enough in the atmosphere to bring the cured product in a condition or order that it may be handled without damage.

A third cultivation follows. The turn-plow is again used in the same direction as at first, but the soil is now thrown toward the plant row. Three or more furrows are run in each row, so as to break up the entire middle and leave it loose and fine, easily penetrated by the extending roots of the plants. This plowing is sometimes followed by the hand hoes, which bring up a small quantity of fine soil around the plant; but this work is rarely done unless the hills become foul with weeds or grass. Long-continued cultivation, especially in the production of heavy types of tobacco, gives profitable results, both in quantity and in quality. The hoe is used at intervals, as needed, to secure perfectly clean culture of the entire surface, and plowing is continued until the attention of the whole force of laborers is required in other pressing demands of the crop, even to seven plowings, if size of plants and the season permit. Priming and topping must be promptly done as soon as the plants are large enough. If this is neglected beyond the proper time, narrowness and shortness of leaf and thinness of texture are the consequences. As soon as any number of the plants have become large enough the laborers go over the field and top them. The first part of this work is the priming—breaking off the lower leaves so as to leave the stalk bare for 6 or 8 inches above the surface of the hill.

Practices and opinions vary as to priming. Those who favor high priming claim that the lower leaves, being farther removed from the ground, do not become so much injured, and there is therefore a smaller proportion of low grade in the product. On the other hand, it is urged that the removal of several lower leaves delays maturity, and that the upper leaves, which are always the best, are lighter and less oily, without compensation in the quality of the lower leaves.

Much the larger number of tobacco-growers maintain that low or moderate priming gives best results in the quality of the middle and upper leaves; that the loss, because of damage to the under leaves, is more than offset by the greater weight and fatness of leaves grown as closely as may be to the sources of nourishment.

A third class of farmers do not prime at all, and give as reasons for their practice that the loss of vitality occasioned by "bleeding" is avoided; that the ground leaves protect those above, so that a larger number of sound, clean leaves are grown upon each plant; that a greater weight of product is obtained; and that the close shading of the soil keeps it moist and in better condition to sustain growth. The objections urged to this method are that the lower leaves afford concealment to the worms; that these leaves are most likely to be neglected in worming; that the close covering and shading of the soil prevents access of sun and air; that in wet seasons evaporation is checked; and that there is frequent loss by field-fire and kindred diseases.

The plant is topped by breaking out the terminal bud. An experienced man performs this operation very rapidly, leaving the desired number of leaves without counting. If eight or twelve are to be left, the top leaves are found at right angles to the lower pair; if ten are to remain, the top pair is in line directly over the bottom ones. The quality of the product as to weight and oiliness depends in a great measure upon the number of leaves left upon the plant. The general practice in the heavy tobacco districts is to top low, and the larger number of planters adopt a standard of ten leaves in the first toppings. A few farmers claim that more weight of higher quality is made by topping at eight leaves; but if the soil is rich and strong ten leaves will develop well and mature into good quality, and this has been deemed the most economic standard for topping.

The maturity of the plant is hastened or retarded as one or another standard of priming and topping is adopted. On strong, rich lands the first plants which "come into tops", especially if they should be few in number, are primed rather high and topped at twelve leaves, thus delaying maturity, so that they may ripen at the same time with the second topping, which is done as soon as a sufficient number of plants are large enough, at ten leaves, with somewhat lower priming, to hasten maturity. The toppings are continued at ten leaves, with lower priming, at successive periods, until late in July or early in August, when only eight are left, the object being to hasten maturity, so that the plant may ripen before the date of probable frost. The standard for both priming and topping is gradually reduced as the season advances, until the latest plants may be topped at four or five leaves without priming at all, each plant being treated according to its individual development and promise.

Upon the removal of the terminal bud, or "button", the top leaves, which were very diminutive, are forced into very rapid growth. The plant makes vigorous efforts to reproduce itself, throwing out branches from the axils of the upper leaves. These branches, or suckers, are pinched out before making a growth of more than 2 or 3 inches, and are never suffered to remain longer than absolute necessity compels. Usually suckers appear in succession, first at the top of the plant, and then leaf by leaf at the axil of each, until the final effort of the plant is made by throwing up one or more branches from the base of the stalk. If "suckering" is promptly attended to, much of the tedious and often unsuccessful searching for worms is avoided, these branches being an excellent hiding-place for the horn-worm, as well as for other insect enemies. The utmost vigilance is necessary to prevent the dwarfing of the crop leaves by the growth of neglected suckers and to save them from mutilation by the worms, and great care is enjoined upon the laborers not to break the stems or tear the leaves. Careless topping frequently injures the tender top leaves, a very slight damage to which manifests itself later in a torn, jagged, or misshapen appearance. Rough handling of the growing plant does not always betray itself until the expanded leaves magnify trifling injuries into serious blemishes. The keenest and closest supervision is therefore necessary, especially when, as is often the case, transient labor, inexperienced and careless, must be employed.

CUTTING OF TOBACCO.

The work of cutting and housing tobacco is commenced as soon as there is a sufficient number of ripe plants. A proper condition of maturity is indicated by the general appearance of the plants: the leaves thick and heavy, of grainy surface, and cracking easily when folded between thumb and forefinger, the points of the leaves curling downward. The afternoon is preferred for cutting, because the plants may be allowed to wilt fully without danger of sunburn.

The cutting tool is usually an ordinary butcher-knife. Two rows are cut by each man, who selects the ripe plants, splits the stalks half way down, cuts them off just below the bottom leaves, and places them upon the ground to the right or left of the double row he is traversing. As two cutters are generally employed, four rows of cut plants are thus brought together into a "heap row". As soon as wilted enough to allow handling, the plants are piled into heaps of eight, ten, or twelve, according to size, each pile having just the number intended to be hung on one stick. The hangers follow, a tobacco-stick having been dropped at each pile by a helper. A stick is thrust into the ground, so as to stand firmly at an angle of about forty-five degrees, and the plants are hung upon it by opening the split in the stalk and straddling them across the stick.

As much is cut during the afternoon as can be handled and removed from the field before the heat of the next day. The scaffolds are generally made in the corners of the fences inclosing the field. These are made by laying three rails or poles on top of the fence, supported at the outer end by forks or other convenient means, so as to permit two tiers of tobacco upon sticks to be hung on each scaffold. As the tobacco is hung the sticks are crowded together as closely as possible. If the field is small, and the distance from the scaffold permits, the tobacco upon the sticks is carried by hand and hung, but if it is necessary to employ a wagon for the purpose these sticks are placed upon the wagon in "coops" or piles, outward and alternately at one or the other side of the pile, care being observed to keep the plants straight and smoothly laid, to prevent bruising. The tobacco is allowed to remain on the scaffold from three to five days, as the weather permits, when it is removed to the barn and placed upon the tiers, ready for the final processes of curing. Some years ago the practice of scaffolding before housing was almost abandoned. Recently this method of preparatory curing is adopted by the majority of planters, because the plant is completely wilted and the texture softened, the leaf yellowing into a clear, golden color, and easily curing into clear colors, with the required toughness and elasticity.

When the crop is to be sun-cured alone, it is placed upon scaffolds in the open field, and it is there exposed until cured or until threatening weather compels its removal to the barns or sheds. To obviate the necessity for removal some planters construct a rough frame over the scaffold, which may be quickly covered with planks or boards. If properly cared for when not in use, tarpaulins are quite as cheap as boards, and, as a protection against showers, are brought into service in much less time.

When tobacco is hung on the tier poles in the barn care is observed to open the plants upon the sticks and to place the sticks apart upon the tiers, so as to admit of free ventilation. From seven to eight large plants or eight to twelve smaller ones are hung upon each stick. The sticks being $4\frac{1}{2}$ feet long, and the tier poles placed 4 feet apart, when the plants are evenly distributed upon the sticks, and the latter separated from 6 to 8 inches apart upon the tiers, there is little danger of house-burn.

If possible, the plants are allowed to come to perfect maturity before cutting them; but in wet seasons, upon the appearance of what is known as "field-fire", they must be cut prematurely, to prevent further serious loss in both quality and weight.

CURING OF TOBACCO.

The object of curing, by whatever process, is to fix the qualities of the plant as to strength and elasticity of texture, flavor, and color. Excellent quality may be lost by unskillful or improper curing, especially when done by artificial heat, and the curing processes must be so managed as to dry out the water without other material alteration of the constituent properties of fiber and tissue.

Several years ago a product of dark colors was so much in demand that the practice became generally prevalent of curing tobacco, as soon as it could be put into the barns, by hard-firing; but it was found that this method resulted in starchiness and stiffness of texture, destroying the pliancy and elasticity of the leaf, and in the loss of oils by too rapid drying. This experiment proved conclusively that artificial heat should be used in curing to assist the natural process, rather than to force it violently.

A necessary preparation for curing by artificial heat is a thorough wilting of the plant, with perfect softness and flexibility of the stem, fiber, and tissue of the leaf. In coming into this condition the color of the leaf is changed from a green into a bright shading of yellow, and it is customary to delay the application of the heat until this change of color has taken place.

Open wood fires are in common use for curing the heavy-bodied types. Two large logs of partially seasoned wood are laid side by side and in contact upon the earthen floor of the barn, and the fires are kindled with a few chips and twigs of small brush between the logs, so that they may become well ignited. The fire is then so managed as to burn continuously without blazing, which is to be avoided, because of the risk of setting fire to the dried tobacco or of injury by forcing the curing too rapidly. A moderate heat at first, gradually increased to such temperature

as has been found by experience best suited to complete the process of curing the desired type, is kept under control by constant watchfulness. The purpose is to carry the curing to such a state of completion that it may be safely left to atmospheric influences, and this is reached when the tissue or body of the leaf is thoroughly dried, the stem being still in a green state. After this no firing is done, except as needed to ward off the danger of house-burn or to prevent mold or mildew, which is sometimes threatened during long-continued damp weather. Under favorable circumstances the leaf will become humid and limp at night, partly by absorption from the atmosphere and partly by diffusion of the juices remaining in the green stems, and dry out during the day. This is deemed highly favorable for completing the curing by natural means.

In a few instances the firing is continued for the purpose of fixing specific colors in the leaf, but this is done at some loss, probably, of general qualities. When the stem is left to cure by gradual drying, the colors produced by artificial heat are always, during the remainder of the process of curing, changed into much darker shades unless the atmosphere should be in a continuously drying condition, for which reason, when it is desired to retain a certain color, the fires are kept up until the stem is also cured.

For convenience in handling and to make the curing in larger bodies, and in order to obtain uniformity of color, larger and closer barns are used in curing with open wood fires than are found best in other methods. The lower parts of these barns are rather close, to prevent winds or currents of air from interfering with the ascent of the heat through the body of tobacco hanging above. In barns too closely built, and not provided with ample ventilation, the elasticity and the strength of the leaf are often much impaired, especially with a large bulk of heavy-bodied plants.

Charcoal as fuel is not much used, and only for the purpose of curing bright wrappers for domestic manufacture. In the Upper Green River district 75 per cent. of the product is air-cured; of the remainder, one-half is cured with charcoal and one-half with wood. When charcoal is used, small piles, of such size and so arranged as to produce the desired volume of heat, are distributed over the floor of the barn, kindled carefully, and thereafter managed so that the temperature shall not be increased too rapidly nor allowed to become too high. Unless the purpose is to obtain fixed colors, the firing is not continued after the curing is sufficiently advanced to admit of safely leaving the remainder of the process to natural means. The advantages of charcoal are the better preservation of the natural flavors of the plant, which are always impaired by the volatile matters emitted from wood in combustion, entire freedom from blaze, with greater safety, and the economy in fuel and labor. The different characteristics of the plants, and the peculiar structure of the houses in which they are cured, make great variation in the fuel required. A large, heavy, fully-developed leaf requires a much larger amount of fuel to bring about thorough desiccation than a small, light-bodied leaf, and a much less amount of fuel is necessary to cure tobacco in a tight, close barn, built of logs, than in a frame house boarded up with thin planks. One authority estimates one hundred and fifty bushels of charcoal for curing one thousand pounds of tobacco.

Flues are also used by some planters for curing bright wrappers. The barns are usually small and closely built, and the flues are of brick or stone, capped with sheet-iron, constructed and operated in the same manner as in the flue-curing districts of Virginia and North Carolina. Peculiarities of soil in which the plant is grown, and, even in a greater degree, the character of the season during cultivation, affect in a very marked manner the results of this method of curing. If the plant, when cut, is full of sap, it is much more difficult to cure into bright colors than when this primary condition is more favorable, and the product of rich soils, of heavy body and strong growth, whatever the variety, has a strong tendency to cure into dark colors.

A barn of ordinary size can be fitted with brick-walled and iron-capped flues, including cost of arches for the furnaces and chimneys for carrying off the smoke, at a cost of from \$40 to \$75, varying with cost of materials and of labor. The investment, once made, is thereafter chargeable with a very moderate tax for repairs.

Throughout the state, except in the Clarksville district, the method most generally practiced is that of air-curing. The proportion of air-cured tobacco is estimated in different localities at from 50 to 90 per cent., and in response to the demand of domestic manufacturers there has been a very large increase in the proportion of the crop cured in this way. The natural flavors so much valued by consumers can only be preserved in purity by what are called the "natural methods" of curing: by sun and air.

Scaffolding the plants for some days before they are put into the barn greatly assists this method, and is an excellent preparation for the work to be done in the house. Crowding the barns cannot be permitted, and abundance of open space is necessary to give free access to currents of air among the hanging plants. The sticks are placed well apart upon the tiers, and the plants separated upon the sticks. Doors and windows are thrown open, except when driving rains make it necessary to close them temporarily. Open sheds are very commonly used in air-curing, and are by many farmers considered best. If the weather is dry and cool, the curing can be done in close-built barns; but if it be damp and sultry, damage by house-burn is almost certain, unless prevented by artificial heat. The heat, whether of open wood fires, charcoal, or flues, injures the product to a greater or less extent; but house-burn is far worse, and must be prevented by judicious and timely firing.

The effects of these different methods, as exhibited in the cured product, are very marked and of widely varying character. By artificial heat firmness and solidity of structure are increased, the strength of texture is preserved,

if the curing is properly done, and the porous system of the leaf is fixed in a permanent state of contraction, which reduces its capacity for too ready absorption and increases its ability to pass uninjured through a high degree of fermentation. It is therefore safer in long transportation by sea, or in exposure, where strong fermentation is to be apprehended. By the method of air-curing the natural flavors of the leaf are preserved, uncontaminated with the acid vapors of burning wood, and its porous system is so developed as to possess large absorptive capacity for moisture and for artificial flavorings. It is much more liable to injury by fermentation than fire-cured tobacco, and is therefore not so well suited to purposes requiring textural strain nor to withstand exposure. It is especially adapted to uses demanding natural and sweet flavors, with a high absorbing capacity. The difference in commercial value of the product cured by the two methods is estimated as follows: Fine grades of air-cured leaf, \$2 per hundred pounds higher than leaf of the same variety cured by fire; medium grades, \$1 per hundred pounds higher. In the lower grades the difference is not marked. This is for products suited to domestic manufacture, and does not apply to coarse and heavy types, in which the methods of curing make little or no difference in the average commercial value. In many heavy types curing by artificial heat, properly applied, makes a tobacco of stronger texture and better keeping qualities, and therefore more valuable.

In the Paducah district a large proportion of the crop is cured by log fires or in open barns by air. In Ballard county one-half of the crop is cured with open wood fires, one-tenth with charcoal or with flues, and the remainder is air-cured. In Graves county three-fourths of the crop is air-cured, and the balance by various applications of artificial heat. In Calloway county one-fourth is air-cured, one-fourth is cured with charcoal, and one-half with wood fires. In the remaining counties of this district neither charcoal fires nor flues are used, the product being partly air-cured and partly cured by open wood fires. A small proportion of the crops of Ballard and McCracken counties is sun-cured, a method which is said to impart peculiar sweetness to the leaf and to make it especially desirable for manufacture into chewing-tobacco.

In the Ohio River district both methods are employed. The product of Hancock county is mostly air-cured. In Caldwell and Crittenden counties the two methods are about equally followed. In Lyon county about 40 per cent. of the crop is air-cured; in Livingston county one-third; and in Breckinridge county from one-third to one-half. Charcoal fires and flue-curing are used to a limited extent in the last two counties. The air-curing in this district is mostly confined to the product of siliceous soils, which, by reason of more porous structure, is much more easily cured in this way than the oily and heavy tobacco grown on calcareous lands.

In the Green River district air-curing is generally adopted, the character of the product being especially suited to this method of treatment.

In the Upper Green River district air-curing is the method adopted for the lighter product; the heavy types are fired. The proportion of air-cured tobacco varies in different localities from one-fourth to nine-tenths.

In the Clarksville district the product is cured almost entirely by artificial heat. It has so much weight and thickness of texture that it cannot be well cured otherwise. It enters very largely into the export trade, and must be cured in such a manner as will preserve it from injury by fermentation, through which it passes in ocean transportation.

In the Cumberland River district both methods are followed. In some parts of the district charcoal is extensively used, and there has been great improvement in handling and curing tobacco. Some excellent bright wrappers have been produced, and there is promise of an increased amount of this type.

TOBACCO-BARNES.

Tobacco-houses vary in character to suit the needs of the farmer, and rail pens, roughly covered, are frequently used for curing and storing the smaller crops of air-cured tobacco. A great many tobacco-houses are constructed of logs, covered with clapboards. The larger planters, especially those who grow the heavier types, have one or more tobacco-barns of large capacity, strongly framed, and weatherboarded or planked upright, with proper arrangements for ventilation. The cost of either class of houses or sheds depends upon the value of the material and the kind of labor employed in their construction. The cheaper sheds are provided by an outlay of \$5 or \$10, while the best barns may cost from \$300 to \$800. For air-curing the houses are purposely built smaller and of more open structure than for curing by artificial heat.

Want of sufficient house-room necessitates the crowding together of the first curing of the season to make room for the later cutting. This necessity involves much risk, and the greatest vigilance is demanded to guard against injury by over-hasty curing in the first instance, followed by serious damage by house-burn, as a result of prematurely crowding imperfectly-cured tobacco. To escape these dangers farmers frequently make temporary use of other farm buildings.

Barns in which flues are placed are built very tight and of small size, and are either framed, closely boarded, and battened, or are made of logs, nicely fitted, and well chinked and daubed. Means of ventilation must be provided for these closely-built houses, so that control may be had as completely as possible of the temperature and of the volume of fresh air to be admitted during the several stages of the curing process.

PREPARATION OF TOBACCO FOR MARKET—WHERE AND HOW SOLD.

At proper and convenient seasons the cured tobacco is stripped and prepared for market.

A moist atmosphere is necessary to produce and maintain proper "order" in the leaf, which cannot be handled without great injury in a dry condition. Cured tobacco is liable to loss of quality and weight while hanging in the barn, and it is an object with good planters to withdraw it from such risk as soon as possible. A favorable season is utilized to take down so much as can be stripped and bulked in proper condition. Bulking is done as soon after stripping as possible, or as soon as the proper "order" is obtained. In some cases the tobacco, when found in proper order, is taken down and put into temporary bulks upon the sticks, so as to preserve and continue this condition until it can be stripped, tied, and packed into bulk for prizing. This is objectionable, because when bulked in the stalk the tobacco lies so loosely as to be easily dried by harsh winds, and stripping is often made impossible without reordering. This can be done successfully by careful management in close houses, or by covering the bulk with carpets, blankets, or otherwise; but generally the method is uncertain, and in most cases the tobacco is left hanging in the barn and stripped by installments, as opportunity permits.

In stripping heavy types the best planters assort into two, three, or even four classes of leaf, putting into each class leaves of similar length, color, and weight, and making two other classes or grades of the inferior lower leaves, the better of the two called "lugs", and the damaged and dirty leaves called "trash". After being thus assorted, the leaves are tied into bundles or "hands" of five to six leaves each, the stems even, and the head of the bundle closely and neatly wrapped with a leaf folded for the purpose, making a tie $1\frac{1}{2}$ or 2 inches broad, and fastened by tucking the stem end of the tie-leaf through the center of the bundle.

If the tobacco is sufficiently cured and in proper order, each day's stripping is bulked at the close of the day; if not in proper condition, the bundles are usually hung on sticks and replaced upon the tiers in the barn, to be brought into bulking order. Sometimes, instead of rehanging, the bundles are piled in ranks, called "windrows", to remain until the excess of moisture is evaporated and the tobacco can be safely bulked. This method is preferred, unless the stripped tobacco is so damp as to endanger its quality by piling in this way, because when well managed it brings the stock into good condition for packing smoothly and closely into bulk. When hung on sticks the bundles, because of not being properly balanced, frequently become crooked, and the leaves are blown open by the winds, so that it is difficult to put them down into a smooth and compact bulk. Nevertheless, rehanging is the only safe way to treat stripped tobacco too soft to be put down in bulk.

For bulking heavy tobacco the desired condition is evidenced by softness and pliability of leaf, the stem only moderately flexible. The texture and fiber should be supple, without excess of moisture, while the stem for one-third or one-half its length should crack slightly in bending. Much care is necessary to secure the right condition for bulking to prevent sweating into a harsh and dry state, which greatly injures the tobacco, and, on the other hand, to avoid mold or "funking", liable to occur when the bundles are packed down too damp.

With light types of tobacco, especially such as are intended for manufacturing fillers, it is requisite that the order should be such as to secure perfect immunity from injury in sweating. Such tobacco is not suitable for use until fermentation has taken place, and is unfit for use if soured or funky in passing through that process. Very few planters attempt the process of sweating in bulk, but prefer to sell the loose tobacco or to prize lightly in casks for delivery to local dealers, who redry it during the spring and summer, putting it in such condition and form as to pass through the necessary fermentation without loss.

The lighter types, because of the necessity for rehandling, are not, as a general thing, so carefully ordered as the heavy tobaccos, and are not usually so neatly handled in tying into bundles or in packing into casks or cases. For the most part, this class of tobacco is sold to dealers who make a business of reassorting and repacking for home manufacturers. In the production of bright wrappers, however, the handling is very careful, the work of assorting very thorough, and the tying and packing is neatly done.

In the assorting of yellow tobacco in the Paducah district about five grades are usually made: First, a uniform bright yellow, leaves perfect and elastic; second, color not so uniform, and leaves not so perfect and elastic; third, mahogany color, yellow and brown spots, making a dappled surface; fourth, imperfect leaves of various colors, from bright yellow to mahogany, called good lugs; fifth, trashy and dirty lugs, composed of sun-parched, soiled ground leaves.

It is the custom of a large class of planters in all districts of the state to hasten the preparation of their crops for market. These crops are sold in bulk to local dealers, or are packed and shipped to the nearer markets, frequently in poor condition, without having passed through the necessary process of bulking to produce the smoothness and compactness essential for neat packing into casks for prizing. This stock is bought to a large extent by rehandlers. The proportion of the annual product disposed of in this way probably exceeds one-half, and much the larger part of this is sold and delivered from the 1st of December to the 1st of April. Of the remainder of the product, which is prized by the planters themselves, fully one-half is sold by the 1st of May, commencing as early as the 1st of January.

A few planters take pride in skillful handling. They assort closely and carefully, and give special attention to stripping, bulking, and prizing. Prizing is generally postponed until spring, to secure proper atmospheric humidity, with mild temperature.

The casks used are from 56 to 60 inches in length by 40 to 42 inches across the head, and cost, including the lumber for heads and nails for fastening, \$2 50 to \$2 75 each. Of heavy tobacco, 1,400 to 1,650 pounds of leaf and 1,600 to 2,000 pounds of inferior grades are packed in each cask. The prizing is so managed that the bundles of tobacco will open loosely and freely when taken out of the package. Different grades are, as far as possible, put into separate casks.

Lighter types, suitable for manufacturing fillers, are prized in the same way as the heavy tobacco, but are not so heavily pressed, from 1,000 to 1,400 pounds being put into a cask of the dimensions above given. Bright wrappers are packed in smaller casks and pressed lightly, the net weight varying from 500 to 700 pounds.

The presses used in prizing are mostly such as are known as "beam prizes", consisting of a single stout wooden lever or a combination of two or more levers, somewhat clumsy and slow of operation, but very effective, and of moderate cost. These presses are usually built upon the farm, and of home material, and may be estimated to cost from \$25 to \$40 each. Local dealers in tobacco use screw-presses mostly, because of the economy of space and convenience and rapidity of operation. These presses cost from \$50 to \$75 each.

In the Paducah district fully three-fourths of the crop prized by the planters is marketed from the middle of April to the middle of June. That sold loose from wagons to dealers is delivered during the winter months, when it is often in unfit condition to be put into hogsheads, and, as estimated, forms about one-third of the whole product of the district. Paducah and Mayfield are the principal markets. The former city, beside the Kentucky product, receives a considerable amount of tobacco from western Tennessee, Arkansas, and the lower counties of southeastern Missouri. From Missouri and Arkansas the receipts are about 100 hogsheads annually. When placed upon the market, a sample, consisting of several bundles, is drawn from the cask, in accordance with legal requirements, and this sample is properly labeled, so as to identify it with the package from which it is taken, and the contents of which it must fairly represent. The package of tobacco is sold by sample to the highest bidder, the planter reserving the right to accept or reject the price thus offered.

The larger part of the product of the Ohio River district is sold to local dealers. The loose leaf, which goes into the hands of local dealers and prizers, is sold by them in the Hopkinsville, Clarksville, Paducah, and Louisville markets, and a small portion is shipped direct to New York. That portion of the product stemmed into strips is always shipped direct to England, and the redried leaf is sold mostly in American markets, a small part going to England. The crop is thus distributed according to its adaptation to various uses, foreign or domestic.

In the Lower Green River district much the larger part of the crop is sold in bulk to stemmers and redriers at Owensboro', Henderson, and other places of minor importance. These two towns are the largest markets in the West for the sale of tobacco in bulk. Tobacco is usually carried to these towns on wagons. Samples are drawn by dealers from each load, so as to represent the grades of which the load is made up, and the price is fixed according to the quality of the sample, the highest offer, of course, determining the sale. In some cases crops are sold to the agents of factories, who are sent out into the country to buy the product of the more important plantations.

At Henderson there are 17 factories, most of them of large capacity, employing a total of 700 laborers, and making an aggregate of 6,000 hogsheads of strips annually. These factories require from 10,000,000 to 11,000,000 pounds of tobacco every year to employ them to their full capacity. At Owensboro' there are about 20 factories, using about 10,000,000 pounds of tobacco annually; and at several other points in this district are factories regularly engaged in buying tobacco in bulk from the producers, making it into strips or redrying the leaf for the English markets.

Strips, as removed from the stem, are tied together in large bunches and hung on sticks about 4 feet in length, which are placed in tiers in drying-rooms for drying out and reordering. They are rarely taken down and put in bulk before the 1st of June, when no mistake can be made as to their exact degree of humidity. From and after this date they are taken down in a very dry condition, barely moist or pliable enough to prevent injury in handling and prizing, and put into bulks, from which they are packed and prized in casks, 1,200 to 1,300 pounds in each. Strips are always packed into casks, with the leaves loose from each other, the ties on the bundles being first removed. From November until June the employes are busy in stemming and ordering the stock, and during the remainder of the season they are employed in getting the tobacco into bulk and prizing into casks.

At Henderson the average yield of strips from 100 pounds of leaf is 68 pounds; at Owensboro' it is estimated at 66 pounds. The difference is because of the heavier class of tobacco stemmed at the former place. The loss in weight includes the weight of the stems removed, in addition to an average loss of 10 per cent. by difference of order when received from the planter and when in proper condition for prizing for export.

Redrying leaf is done in the same manner as with strips. Almost always the bundles as tied by the planters are ordered, redried, and packed without other rehandling. Some large factories are exclusively employed in redrying leaf for use in domestic manufacture.

Strips are annually shipped direct to English markets, being very rarely offered for sale in America. The strips of this district will absorb 15 to 33 per cent. of moisture and flavoring matters in process of manufacture. Redried leaf is shipped to some extent direct to England; but a large part of it is taken in American markets for domestic manufacture, for which purpose it may be prized to weigh 1,400 to 1,600 pounds net.

A large number of local dealers throughout the Lower Green River district make a business of purchasing tobacco from the planters, prizing it into casks or otherwise packing it in the same condition as received from the

planter, and shipping or hauling it to interior distributing markets, either to Hopkinsville, Clarksville, or the Ohio River towns.

Probably 75 per cent. of the crop of this district is sold in bulk, and is marketed and delivered from November to May, the time for marketing the entire crop extending from November until the 1st of October following.

Of the product of the Green River district fully three-fourths is sold to local dealers, who receive it in bulk, and most of it is delivered between the 1st of December and the 1st of April. The dealer buys the tobacco under contract for delivery in a specified state of preparation and order. Much of the crop being delivered in such poor condition as greatly to reduce its value, many of the local tobacco-buyers have houses constructed for the purpose of rehandling it, and some of them attempt to utilize ordinary barns, constructed for curing, but not suited for rehandling the stock. Some of these local dealers make a business of purchasing and redrying such kinds of tobacco as are required for certain classes of domestic manufacture, in which enterprise they have been quite successful. The crop of this district goes mostly to the Louisville market, a small part of it direct to New York, and a few shipments for sale are made at Evansville, Indiana.

The crop of the Upper Green River district is marketed almost entirely at Louisville, occasional shipments being made direct to New York. The system of railway transportation, which reaches nearly every portion of this district, having Louisville as a common terminus, gives that city permanent advantages in the control of the product of this territory. Freight charges are moderate, shipments can be made at any time, and tobacco delivered at Louisville can be sampled and sold during any business day of the year. The charges at Louisville are 50 cents drayage on each cask from the railway depots to the warehouse; \$2 per cask and 1 per cent. on its gross proceeds for receiving, inspecting, and selling, with a privilege of four months' storage free of charge to the shipper.

In the Clarksville district the crop is marketed from December to September following, the larger part being delivered and sold from April to July. From the middle of April to the middle of July is the period of fermentation, during which time tobacco handles and shows to the very best advantage if in proper condition. A small part of the crop is sold to stemmers in bulk, and is made into strips for the English markets, and a considerable quantity is sold to local dealers, who reassort the leaf and prize it for sale in some of the interior markets, as Clarksville, Hopkinsville, or Louisville. The larger part of the crop is prized by the planters themselves, and is shipped and sold for their own account. Casks 58 by 40 or 60 by 42 inches cost about \$2 50 each, and are prized to contain 1,500 to 1,700 pounds of the better, and 1,600 to 2,000 pounds of the inferior, grades of tobacco. The product of this district is sold mostly at Clarksville and Hopkinsville under similar regulations to those prevailing elsewhere in the state. At Clarksville the charges to the shipper for selling are \$2 10 on each cask and 1 per cent. commission on gross proceeds; in Hopkinsville, \$2 50 on each cask and 1 per cent. commission. A small part of the crop is shipped to Louisville for sale, and a few shipments are made to New York direct.

As the product of this district is mostly taken for export, and is sold in foreign markets in the original packages, the handling and ordering are much more careful and thorough than with the product of lighter body in other districts, much of which is, of necessity, rehandled to put it in marketable condition. The leaves are carefully assorted into two, three, or four uniform grades, tied into small and neat hands, properly conditioned by hanging up in tiers or by placing in windrows, where it is allowed to remain until brought into the desired order, and then packed smooth and straight into close bulks, from which, at the proper time, it is packed into casks and prized. The right condition for bulking or packing is obtained when the body of the leaf is soft and pliable and the stem supple, but solid and firm for one-half of its length. If the stem be soft from moisture contained in it, the soundness of the tobacco, either in bulk or in the cask, is much endangered by excessive fermentation.

In cold, wet seasons the order or condition is very uncertain, and cannot be relied on, as the leaf does not show the full amount of contained moisture, and if packed at such time will become soft and overdamp when the temperature becomes warmer. It is almost equally objectionable to have the leaf too dry, as this prevents smooth and neat handling and close packing, and it is apt to become harsh, stiff, and rough after fermentation. Bulking and packing can be safely done only when the atmosphere is warm and soft enough to produce pliancy of leaf without excess of humidity. It is desirable that the tobacco shall not contain moisture enough to affect its keeping qualities, and shall yet retain enough to sweat it into a soft and supple condition. The work of assorting and stripping is done in winter; that of ordering and bulking during the winter, but mostly in spring; and that of packing and prized into casks during spring and early summer.

The Cumberland River district lies chiefly on either side of the river from which it takes its name. This river is the principal means of transportation, and is navigable only for short seasons during the year. It is an object, therefore, with producers to hasten the preparation of their crops for market, in order to avail themselves of the earliest opportunities for shipment. The produce of the western portion of this district is hauled in wagons to a branch of the Louisville and Nashville railway which terminates at Glasgow, and a small amount is delivered at one or more points on the main line of the railway. The lack of reliable and cheap transportation imposes a heavy tax upon the producer in getting his tobacco to market. A large part of the crop of the district is sold to local dealers, the amount thus disposed of being estimated at from one-half to two-thirds of the whole. No stemming is done, and the entire product is marketed at Louisville and Nashville.

THE WHITE BURLEY DISTRICT.

This district occupies a territory embracing, in whole or in part, twenty-four counties in the northern part of the state. If a straight line should be drawn from Louisville to Paris, in Bourbon county, and thence to Portsmouth, on the Ohio, it would form nearly the southern boundary of the White Burley district of Kentucky, while the other boundaries would be limited by the Ohio river. It embraces about 3,000 square miles, and is traversed by the Kentucky and the Licking rivers, both of which are navigable for small steamboats for some months every year. The tributaries of these rivers ramify into almost every square mile of the district.

PHYSICAL FEATURES.

No part of Kentucky has a more diversified surface than that embraced within the district under consideration. Probably it would be within limits to say that in the White Burley district one-third of the territory is level or slightly undulating, one-third broken, and the remainder knobby and often very rough. Passing through the center from north to south is a lofty elevation, known as Dry ridge, along whose crest for many miles the Cincinnati Southern railroad passes. From this backbone, easterly and westerly, numerous spurs shoot out. Between Dry ridge and the southeastern limits of the district one deep, bifurcated trough occurs, forming the water-sheds of the south fork and the main stream of the Licking river. East of that river the surface becomes more elevated, until it culminates in the rugged heights of the eastern coal-field of Kentucky. West of Dry ridge the basin of the Kentucky river occurs, about midway between the ridge and the western limits of the district on the Ohio river. From Dry ridge to the Kentucky river the general slope of the surface is toward the northwest, but west of that river the slope is more decidedly north, though in Oldham and Trimble counties the longest slope is toward the west. The whole White Burley district may be described as a table-land, gashed by numerous streams. The ease with which the rocks are crumbled by natural forces, though giving an uneven surface to the country, assures a high degree of productiveness wherever the constituent elements of the rocks possess the basis of fertility.

GEOLOGICAL FORMATIONS AND SOILS.

With few exceptions, all of the rocky formations of this district belong to the Lower Silurian age, and, for the most part, the rocky beds lie in a position so nearly horizontal that over broad districts no dip is perceptible. The soils vary greatly in fertility, those derived from the marly calcareous limestones, characterized by the presence of fossil shells and of arenaceous material, being generally the most fertile and friable. When the limestones contain a large proportion of magnesia, the soils are arid; when of argillaceous matter, wet and cold. Owing to the unevenness of the surface of the country and the generally horizontal position of the strata every bed in a vertical range of probably 800 feet is brought to the surface. In the eastern portions of Lewis and Fleming counties the stiff soils of the Devonian shales appear; below them the brownish-red soils, derived from the magnesian limestones of the Upper Silurian, which in turn are succeeded, in going west, by the rich, black, fertile loams that rest upon the marly limestones of the Lower Silurian. In many counties of the district, notably in Scott, Owen, Gallatin, Carroll, Grant, and Boone, the rocks that give character to a considerable area are different varieties of a peculiar earthy siliceous "mudstone", interstratified in the blue limestone formations. The aggregate of these varieties of "mudstone" or "rotten sandstone" are said to have a thickness of 100 feet. The elevation of this bed above the Ohio river is from 200 to 300 feet, and the color of the layers is buff or a dirty yellow. They contain a small percentage of lime and a large percentage of sulphuric acid and silica. From some of the members of this bed a cold, wet beech land is derived. On well-drained slopes the soil from this "mudstone" is much better, and supports a growth of hickory, oak, tulip-tree, sugar-tree, and some walnut and hackberry. Above and below the "mudstone" the soils are more productive, being derived from the blue limestones, which are rich in mineral fertilizers.

The following analysis of the best soil in the blue-grass region was made for the geological survey of Kentucky by Dr. Robert Peter:

Organic and volatile matters.....	7.771
Alumina and oxides of iron and manganese.....	12.961
Carbonate of lime.....	2.464
Magnesia.....	0.173
Phosphoric acid.....	0.319
Sulphuric acid.....	0.170
Potash.....	0.393
Soda.....	0.130
Sand and insoluble silicates.....	75.266
	<hr/>
	99.647
	<hr/>
Moisture driven off at 300°.....	4.700
	667

ANALYSIS OF A SUBSOIL.

Organic and volatile matter	6.450
Alumina and oxides of iron and manganese	13.773
Carbonate of lime	3.476
Magnesia	0.354
Phosphoric acid	0.447
Sulphuric acid	0.032
Potash	0.498
Soda	0.095
Sand and insoluble silicates	75.434

It is the universal belief among the farmers of this region that when a field fails to produce a good crop of corn or tobacco it is only necessary to seed it in blue grass and let it remain for four or five years, that all its pristine fertility may be restored. Only one or two of the schedules received from this region mention the practice of manuring. The very great fertility of these limestone soils is attributed by Dr. Peter, of the geological survey:

1. To its state of extreme division. The very fine sand will pass through the finest bolting cloth of 5,000 apertures to the square inch, leaving 0.04 of 1 per cent. of quartz grains not as large as a mustard-seed.
2. Its large proportion of phosphates and the alkalis.
3. The great amount of organic matter which it contains. This gives a dark color to the surface soil, which increases its power to absorb and retain heat, and also gives it such porosity that it will retain a large amount of moisture. Heat and moisture, combined with the large proportion of the most essential elements of plant food and the excellent mechanical condition of the soil, make it among the most productive and desirable soils in the United States.

WHITE BURLEY TOBACCO.

Mention is made in the chapter on Ohio of the origin of the variety of the tobacco plant known as the White Burley. It is believed that fully four-fifths of the plug tobacco used in the east, north, and west is made from this variety, and its introduction and culture has worked one of the most remarkable revolutions known to the agriculture of this country.

Within the last ten years the whole of what is now called the White Burley district has abandoned every other variety. This tobacco is porous, but of fine texture, is almost destitute of gum, and cures up a remarkably uniform bright or yellowish-red color, varying from bright yellow to bright red and cinnamon.

At first the White Burley was planted closely, the rows being 3 feet apart, and the plants set in the rows from $1\frac{1}{2}$ to 2 feet apart, and it was topped from eighteen to twenty leaves. This was done to give thinness to the leaf and to adapt it more fully to making cutting tobacco. In 1868 the manufacturers of cutting tobacco rejected the White Burley on account of its bright color, and in 1871 and 1872 the production was very limited. Toward the close of the latter year Spaulding & Merriek, of Chicago, determined to establish a brand of cutting tobacco made from this peculiar type. This they did, and successfully competed with all other brands on the market, and there sprang up at once an active demand for the White Burley from all the cutting trade.

Cutters now prefer about one-third of the heavier sorts and two-thirds of the lighter kinds. The heavier sorts are used in manufacturing plug and navy, and to some extent for bright smokers, and the lower and medium grades, when prices will justify, are taken in small quantity for export to Germany. The medium grades are also in demand for making brown roll in England and for making bright-cutting strips, but nine-tenths of the whole product is consumed in the United States.

The crop of 1875 was noted for its excellent cutting qualities, and was larger by 25 per cent. than that of the preceding year, which latter crop was readily taken at good prices. The crop of 1876 was about 12 per cent. greater than that of 1875. The high prices stimulated the planters to a more careful culture and a more extended planting, and the crop of 1876, in consequence of this unusual culture, had a heavier leaf and larger absorbing qualities. This especially fitted it for the plug manufacturer, and experiments which had been made showed it to be suitable for making very popular brands of chewing-tobacco. Orders came in from New York, Richmond, Petersburg, Lynchburg, Chicago, and other points so rapidly that the prices of the heavier grades were relatively advanced, and the attention of growers of the White Burley was, after this period, directed to the production of a heavier type than the cutting leaf, to meet the constantly-growing demand of the plug manufacturers. Since 1877 what was believed to be exceptional in 1876 has become the standard type. The consequence is that, while all shipping styles of tobacco have been dull or depressed, the leaf tobacco of the White Burley district has commanded prices double, and sometimes quadruple, those paid for the best shipping leaf produced in other regions of the state. Nor is the profit confined to the increased prices received for the White Burley tobacco. The labor necessary for making this variety is much less than that demanded for the export tobacco, and the risk of curing, by not using fire, is reduced to the minimum. The farmers living in the northern part of the state raise the same product as those in the southern and western parts, and receive from two to three times the remuneration for labor expended; yet all these cultivate soils that do not differ materially in fertility and capacity of production, nor in accessibility to good markets.

COMPARISON OF TOBACCO CROPS.

The crop of 1877 was 21 per cent. less than that of 1876, but showed a marked improvement in quality; and the product of 1878 was nearly equal in amount to that of 1877, with still further improvement. The crops of these two years were the best that were ever raised in the district, that of the latter year ranking highest. Both crops were well ripened, free from the effects of disease, and commanded very high prices. Stimulated by these high prices, the product of 1879 was the largest in acreage and in yield of any crop ever grown in the district; the boundaries were extended, unusual attention was given to preparations for the crop, and the quality of the product, up to the time of housing, was equal to that of any previous year. Unfortunately, however, the crowded condition of the barns, consequent upon the large crop and the very warm weather which set in about the 1st of October, caused at least 10 per cent. to be greatly damaged by house-burn. Superadded to this calamity, the supervening mild weather, with much rain, produced a barn-mold, which in its effects was almost as damaging as house-burn. With good, close barns much of this damage could have been avoided; but the hurry and rush of many farmers to plant out a crop, taking the risk of curing it in temporary structures, resulted in very serious injury to the tobacco. A great deal of it was cured in rail pens and open barns, with no means of protection against the fogs and beating rains, and the result was that, notwithstanding the large crop planted and well harvested, there was less good, sound tobacco on the market than in the previous year. Prices ruled very high for the first half of the year, and only showed a decline when the fact was well established by the middle of June, 1880, that another very large crop was planted. Bright lugs advanced during the commercial year in Cincinnati from 5 to 7½ cents, at the commencement of the season, to 6 to 10 cents, and bright fillers from 11 to 15 cents to 14 to 20 cents.

The White Burley, while growing, has a pale-green or greenish-white color, and the leaves grow closely on the stalk; consequently a plant having the same number of leaves is not so tall as those of many other varieties. It is very delicate when young, is more sensitive to the heat of the sun or continued wet than any other kind, and is not a favorite variety with the less careful cultivators because of this tenderness of constitution, which causes it to perish easily when transplanted. A stand is therefore difficult to obtain. Two weeks are generally required for it to become established after transplanting, but when it begins to grow it outstrips the other varieties, and is ready for harvesting two weeks earlier than any other variety planted at the same time. Originating from the Red Burley by cross-fertilization, there is a very decided tendency to revert to the original type. The first years after it originated the White Burley, after curing, was silky, fine, and light-bodied, with a yellow color on the upper surface and white beneath. It grows thicker and less delicate every year, and it is believed that the retroversion to its original type will in a few more years be complete.

In the White Burley district there are two distinct classes of tobacco grown. In the counties of Owen, Franklin, Henry, Oldham, Scott, and Trimble cutting tobacco, or what may be used for cutting purposes, is grown almost exclusively. The counties of Boone, Kenton, Gallatin, Grant, Campbell, Pendleton, Harrison, Bracken, Robertson, Nicholas, Mason, Lewis, and parts of others make a heavier article, used for fillers mainly, but some cutting leaf. The tobacco grown in the last-named counties has more gum than that grown in Owen and the surrounding counties, which is light, thin, and chaffy. Unquestionably the soil has a powerful influence upon the quality. All the returns concur in this. One from Owen county says:

An open soil will produce a quick growth, which is essential in making a porous product. Slow growth insures a hard, compact quality, of dark color. Eastern or southeastern slopes produce the best quality of tobacco. Ridge lands and lands sloping to the west induce a slow growth, and are therefore not so desirable.

Another schedule, which applies to the whole district, says:

On newly-cleared lands a lighter-colored tobacco is grown, which makes a fine cutting leaf. Old lands make fillers, sometimes wrappers, mahogany in color, rich, and oily. Second year's land (that is, land which has only been cultivated one year) makes a cherry-red tobacco, suitable for fillers.

A correspondent from Robertson county says:

Strong, loamy soils do not produce so fine a quality of tobacco as white-oak and sugar-tree clay.

One from Carroll county says:

On freshly-cleared lands the tobacco will cure a better color, but light in body and better adapted for cutting purposes, making, however, few pounds per acre. Old lands grow tobacco of better body, less color, more useful for plug fillers, and with more pounds per acre.

Another schedule from Owen county says:

On new lands tobacco grows very thin, light, and bright; on second year's land it is heavier, with more body, and the quality more useful. On old sod land the tobacco is still heavier, is red in color, and is better adapted to the use of the manufacturer of plug and for export.

Precisely the same statement comes from Kenton county. Fleming county, which probably has a greater variety of soils than any other county in the district, reports:

Rich, sandy soils produce the finest quality of tobacco; black loam grows the heaviest and darkest in color; white-oak lands the lightest and highest-priced qualities, used both for wrappers and for making fine-cut.

Mason county, which has been celebrated for fifty years for the delicacy and fineness of its tobacco, reports:

Oak lands produce the finest quality, commanding the highest prices, especially that raised on fresh or newly-cleared lands. By "finest quality" is meant a product showing great silkiness of leaf, brightness of color, exceedingly soft to the feel, smooth, lustrous, and elastic, fine in grain and texture. This style of tobacco will bring \$5 per hundred more than that grown on beech lands.

One schedule from Bracken county says:

On new or fresh lands the color is brighter, but the product is not so heavy as on old, strong lands. It cures up a rich, golden color, while that grown on old land is red in color, but with better body. The soil being the same, that grown on southern hillsides is finer and cures up brighter in color.

All the other counties in the district report substantially the same in relation to influences of soil upon quality.

GRADES OF PRODUCT.

These vary greatly in the different counties of the district. The following table will show the proportion of different grades as reported from the typical counties:

Counties.	Dark Shipping.	Fillers.	Bright smokers and wrappers.	Cutting.	Nondescript.
	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
Boone	10.00	20.00	30.00	40.00	.....
Bracken	12.50	25.00	25.00	25.00	12.50
Carroll .....	.....	33.00	17.00	50.00	.....
Fleming	30.00	30.00	15.00	15.00	10.00
Henry .....	.....	20.00	30.00	40.00	10.00
Mason .....	.....	33.33	33.33	33.33	.....
Owen .....	.....	20.00	10.00	60.00	10.00
Pendleton .....	.....	20.00	5.00	60.00	15.00
Robertson	25.00	33.33	10.00	20.00	5.00

Taking the average of the whole district, and the proportion would be about as follows: Dark shipping, 10 per cent.; fillers, 30 per cent.; bright smokers and wrappers, 20 per cent.; cutting, 35 per cent.; nondescript, 5 per cent. The scarcity of the latter grade is due to the fact that the colors of the White Burley are exceedingly uniform, and the inferior grades are put in the smoking grade. The only nondescript in the district comes from the attempt to grow White Burley upon soils unsuited for it, and the product from such soils is known in the market as Bastard Burley, and is deficient in color and other desirable qualities. Much of this, however, is used for plug fillers.

SOILS BEST SUITED FOR WHITE BURLEY TOBACCO.

It is considered by all correspondents that the finest tobacco is grown upon rolling lands, with a good clay subsoil and a timber growth of hickory, white oak, tulip-tree, beech, walnut, hackberry, black locust, and ash. Wherever the white-oak tree grows in any quantity the soil is called oak soil. While a few planters prefer old land, because the yield is much larger, a large majority prefer freshly-cleared oak lands upon the southern and eastern sides of hills. On the undulating lands, where the soil is derived from the crumbling of the highly calcareous, sandy, blue limestones, and where blue grass has formed a sod for many years, a very useful quality of tobacco is produced for manufacturing purposes, and these are preferred next to the freshly-cleared oak lands. All the soils of the district have more or less imbedded gravel. One correspondent says: "For quality, oak lands; for quantity, fat, rich, calcareous soils, with a mixture of walnut and burr oak." The soils preferred vary somewhat in different counties. In Owen county, for example, the soils are classified in the order of preference as Nos. 1, 2, and 3. No. 1 supports a growth of sugar-tree, beech, tulip-tree, hackberry, and white walnut. This approximates the typical blue-grass soil. No. 2 has a growth of white oak and other associate trees, and has more clay in its composition, is not so fertile, does not yield so many pounds per acre as No. 1, but makes a good, rich-colored tobacco. No. 3 has a tree-covering of ash, locust, tulip-tree, and some others. The soil resembles river and creek bottoms, and, like the latter, grows a coarse, rough, bony tobacco, used more for plug than for cutting. The eastern exposure in newly-cleared lands always makes the most salable tobacco. Level lands grow tobacco much like that grown on river bottoms, coarse and harsh, but leafy.

The soils in nearly every part of the district are very durable. When apparently worn out and exhausted, if turned out, and a sufficient time is allowed to permit fresh assimilable elements to be unlocked by disintegration from the underlying shales and limestones, they become as fertile as ever.

It is thought that in quality tobacco has improved fully 25 per cent. within the past decade. Even the tendency of the White Burley to revert to the characteristics of its parentage, of which mention has been made, and which by some is called a deterioration, has been to the advantage of the planters, and a most extraordinary demand has been created for the product of the reverting variety. It approaches the true ideal of a filler. The color is good; it has large drinking capacity; is mild in its effects; has a delicate flavor and good body, and is popular with consumers. Ten years ago a very inconsiderable portion of the tobacco of this district went into plug; now fully one-half of it is worked into plug and smokers for domestic use.

FERTILIZATION OF TOBACCO.

In no other district in the United States, not even in the rich tobacco districts of Missouri, is manuring neglected so much. This is accounted for in part by one correspondent, who says that tobacco is either planted upon freshly-cleared lands, where no manure is thought to be necessary, or upon old sod land, which is found to produce excellent tobacco without any fertilization. In Bracken county a very small amount of land plaster is sometimes put in the hill. In Kenton county one-tenth of the tobacco area is estimated to be fertilized. Bone dust is used sparingly by a few farmers, and stable manure at a cost of from \$5 to \$10 per acre. Lewis county reports that about 33 per cent. of the tobacco land has an application of stable manure. A small number of farmers in Owen county apply a special fertilizer, known as "tobacco-plant food", to the hill after planting, and about 150 pounds to the acre are used, at a cost of \$3. Barn-yard manure is now used in Robertson county to a very limited extent. The remaining counties report no fertilizers used, though all admit that well-manured soils will increase the yield from 33 to 50 per cent., beside greatly improving the quality of tobacco produced.

PREPARATION OF THE SOIL FOR TOBACCO.

Old sod land is usually broken in the fall or early spring to the depth of about 6 inches and allowed to remain until about the 1st of May, by which time the sod will be thoroughly rotted. It is afterward well harrowed and pulverized and laid off for planting. The most approved plan now is to lay off the rows $3\frac{1}{2}$ feet apart and make small hills in the row from 2 to 3 feet apart. Some prefer a shorter distance for the hills in the rows, under the impression that the shorter the distance to within a foot and a half the smaller will be the stems and fibers. Others aim to produce tobacco of a little heavier body, that may be used either as a heavy cutter or as a bright filler, or even as a heavy filler. To do this the distance is increased between plants. Some few, on old manured lands, go as far as 4 feet for the distance of the rows apart, with hills 3 feet apart in the rows. The distance apart of the plants is probably a less important factor than high or low topping in the determination of special types, and much less than the character of the soil upon which the plant grows.

It is claimed by some good planters that a silkier article of tobacco may be made by cultivating the sod land the first year in corn, following the corn with tobacco. The usual rotation is tobacco, wheat or corn, clover or blue grass, and then tobacco again after two years of clover and several years of blue grass.

The cultivation of the crop is the same as in other districts, and is much better now than before the introduction of the White Burley, for it was a general belief that working the soil well made the Red Burley coarse and rendered it unfit for cutting purposes. The result of better working has been largely to increase the yield of the crop. This is usually plowed three times and hoed once.

Planted usually between the 15th of May and the 1st of July, the topping is done between the 10th of July and the middle of August, and the harvesting from the 20th of August to the 10th of October. The plant is not pruned, and in this the practice is different from that of any other district in the state. From twelve to sixteen leaves are left to the plant. Some farmers top as high as twenty leaves, but it is found that the leaves are not so large nor so uniform in size and color, nor is the cured product of such desirable quality. It is thought also that a larger number of pounds can be made by topping to twelve leaves than by topping to twenty.

Tobacco in this district is usually suckered two or more times before it ripens. The period between topping and harvesting varies upon different soils, and by reason of high and low topping, and the prevalence of wet or dry weather for from four to seven weeks, the earliest maturity takes place on warm southern exposures, upon a quick black or brown limestone soil. Northern exposures, clayey soils, wet weather, as well as high topping, all delay the period of ripening, but the average length of time between topping and cutting may generally be put at four weeks.

HARVESTING OF TOBACCO.

When fully ripe, the plants are cut with a knife by splitting the stalk, as in the other districts of the state, the time preferred for this operation being the afternoon. A method of cutting and hanging prevails to some extent in Bracken county which is unusual. Each cutter takes three rows, and as each plant is severed it is straddled over a stick set up in the ground in the center of the space occupied by six plants, this number being allotted to each stick. In this way the plants are cut and hung without being laid upon the ground. This saves time, and secures neatness in handling. These sticks, $4\frac{1}{2}$ feet long, with their loads of tobacco, are either taken directly to the barns and hung 12 inches apart on the tier poles, or are placed upon scaffolds erected with poles in the open fields or in the angles of a worm fence. About two-thirds of the farmers scaffold their tobacco. The sticks are allowed to remain from five to eight days on the scaffolds, and are then taken to the barns and arranged on tier poles 8 inches apart. It will be observed that one-third of the space in the barns is saved by scaffolding, and, beside, it is thought that tobacco is not only sweeter by taking the sun for a few days, but that the danger from house-burn is much decreased. But tobacco should never be scaffolded in rainy weather. If freshly cut, the leaves get in a condition known as a "strut", and are easily injured in that condition in consequence of their exceeding tenderness. Scaffolds are also liable to give way in wet weather and precipitate the tobacco in a compact mass

to the ground, by which it is bruised and broken, and if it is not taken up at once it is liable to heat and coddle in the mass, which is as destructive as the action of frost. When well wilted, and before the leaves begin to turn brown, rain will do no injury.

CURING OF TOBACCO.

No fire is used in curing White Burley tobacco. About eight weeks are required to cure it well by the ordinary process of air-curing when put into the barns, which are provided with ample facilities for ventilation. The openings are not closed day or night, unless there is an excess of wet weather, when the doors are closed. Too much dry weather during the process of curing injures the tobacco by decreasing the elasticity and the toughness of the leaf and destroying the uniformity in color, making the leaves mottled. An old grower says:

If the weather is very dry, it will be changeable in color; if too wet, the color will be too dark; but after cutting, if the weather is fine, with occasional showers, the tobacco will cure a beautiful bright color.

ASSORTING AND STRIPPING OF TOBACCO.

The tobacco being fully cured, it is taken down when in proper condition and assorted into four or five grades, as follows, beginning at the bottom of the stalk and going upward to the top:

1. The sand leaves, trash, or flyings. This grade is made up of the soiled and parched leaves, varying in number from one to three.
2. Good trash or lugs, taken next above the ground leaves, varying in number from two to three leaves.
3. Bright and prime leaves, taken from the central part of the stalk, in number from four to six.
4. Tips, or top leaves, red, in number from one to three.

Two classes of "reds" are sometimes made, known as first and second reds.

Some planters only make three classes, trash, lugs, and good; the first being the ground leaves, the second the imperfect leaves, and the third the bright middle and top leaves. If the tobacco is topped low, there is great uniformity in color and length of all the leaves near the top; but if topped high, the upper leaves are small and imperfectly developed.

These several grades are tied into bundles of ten to twelve leaves each, rehung upon sticks, and crowded upon the tier poles until damp, warm weather supervenes, which is most favorable for ordering. The sticks are then given greater distance, and when the leaves become sufficiently pliant to handle without breaking the tobacco is taken down, bulked, and weighted, each grade being kept separate. In this condition probably nine-tenths of all the tobacco grown in the district is sold to local dealers, who receive it in houses prepared for prizing, and pack from 700 to 1,100 pounds for fine grades, and from 1,200 to 1,800 pounds for trash and lugs, in each cask. These casks are by no means uniform in size. Some of them are 5 feet high and 48 inches in diameter; others 5 feet high and 42 inches in diameter; and again others are 56 inches high and 48 inches in diameter. Local dealers buy at all times, from the period when the crop can first be examined after curing until the following May or June. It is estimated that the cost of prizing, shipping, and selling the crop, including the cost of hogsheads, will amount to \$2 per hundred pounds. This also includes shrinkage in the weight of the tobacco from the time it goes out of the planter's hands until it reaches the market where it is inspected and sold. This shrinkage is estimated to vary from 3 to 8 per cent., and if permitted to go through the sweat before being sold 5 per cent. more must be added.

A crop that has been properly cultivated, kept free from worms, neatly and carefully handled, well assorted into grades, tied into neat hands, artistically packed and prized into hogsheads of the weight required for each grade, will bring in the market from 33 to 50 per cent. more than one that has been grown upon similar soil and handled in a slovenly manner. There is a wide range in prices. For instance, when the crop is assorted into two grades, only 8 cents and 4 cents for the two grades may be considered a fair average price, while the same crop, if assorted into four grades, would bring 15, 12, 10, and 4 cents for each grade, respectively, of bright, red, lugs, and trash.

VALUE OF THE TOBACCO CROP OF 1879.

The following statement will show the prices received by planters in the counties named for the crop of 1879:

Counties.	Trash.	Lugs.	Red.	Bright.	Average.
Boone	\$4 00	\$7 00	\$10 00	\$12 00	\$10 00
Bracken	5 00	9 00	15 00	19 00	12 00
Carroll	3 00 to 4 50	5 00 to 7 50	12 00	16 00	10 00
Fleming	5 00	7 00	9 00	14 00	10 50
Henry	5 00	6 50	9 00	12 00	10 00
Kenton	3 50 to 5 00	6 00 to 8 00	10 00	18 00	11 00
Lewis					7 00
Mason	3 00	8 00	12 00	18 00	12 00
Owen	3 00	7 00	12 00	20 00	12 00
Pendleton					10 00
Robertson	3 00 to 4 00	6 50	10 00	12 00	9 00

Sometimes tobacco is graded into smokers, cutters, fillers, and nondescript, each of these having sub-grades. The prices for such grades are: Smokers, 5 to 12 cents; cutters, 10 to 30 cents; fillers, 8 to 20 cents; nondescript, 3 to 8 cents.

The average price given in the last column of the table is the price usually paid through for the crop when bought by local dealers, and is a much fairer index of its value than the prices affixed to grades, because the quantity in each grade is exceedingly variable in the different crops. Many of the schedules give no price for grades at all. Taking the whole district through, the average price received for the crop of 1879, loose, by farmers, is not far from 10 cents per pound.

The only county in the district which makes an average yield of 1,100 pounds to the acre is Mason. The following counties make a yield averaging between 1,000 and 1,100, viz: Boone, Gallatin, and Montgomery. The counties whose average yield is between 900 and 1,000 pounds per acre are Bourbon, Carroll, Henry, Kenton, and Shelby; those making an average yield of between 800 and 900 pounds are Bracken, Fleming, Grant, Nicholas, Oldham, Owen, and Trimble; between 700 and 800 pounds, Campbell, Franklin, Harrison, Pendleton, Robertson, and Scott. Those making a yield below 700 pounds are Lewis and Woodford. Woodford county, at the time the census was taken, could not with any propriety be considered as a tobacco-growing county of the White Burley district. It really entered upon the culture of the crop in 1880.

COST OF TOBACCO PRODUCTION.

Three different detailed reports make the cost of growing the crop on best soils, respectively, \$3, \$3 52, and \$3 60 per hundred pounds, and upon such inferior soils as are planted in tobacco \$6 to \$8 per hundred. One of these statements, from Owen county, is appended. One man can successfully cultivate and house, by exchanging labor, 5 acres of tobacco, which, on best soils, will yield 1,000 pounds per acre. So we have:

Cr.	
By 5,000 pounds of tobacco, at 10 cents	\$500 00
Dr.	
To hire of hand, six months	\$90 00
To board of hand, six months, at \$10	60 00
To use of horse, plows, barns, etc	20 00
To rent of land (interest on price)	6 00
	<hr/> 176 00
Profit on each hand employed	324 00
Cost of production per pound, 3.52 cents.	<hr/>

This represents the profits under the most favorable circumstances. Taking the average of the district, 876.32 pounds per acre, and assuming the expense to be the same, the profit on each hand will amount to \$262 16. But this is probably not a fair estimate, as the number of acres allotted to each hand will not exceed three. One schedule from Robertson county says 4 acres to each hand is the maximum. Owen county reports the number of acres for each hand at 5, and sometimes 6, while schedules from other counties give from 2½ to 3. Assuming, then, 3 acres as the average amount of land allotted to each hand, and that the yield per acre is the average of the district, or 876.36 pounds, we shall have:

Cr.	
By 2,628.96 pounds, at 10 cents	\$262 91
Dr.	
To hire of hand, six months	\$90 00
To board of hand, at \$10 per month	60 00
To use of horse, plows, barns, etc	20 00
To rent of land (interest on price)	3 60
	<hr/> 173 60
Profit on each hand	89 31
Cost of production, 6.6 cents.	<hr/>

This is probably more nearly correct for the whole district than either of the other estimates; but there is no doubt that the profits on individual crops are often very great. Mr. J. M. Chambers reports a crop grown in Mason county, without manure, on land which has been cleared for ninety years, but upon which blue grass had grown and been depastured for many years. Upon 7 acres of this land a crop of 14,000 pounds was raised, which brought in the market an average of 12 cents per pound, or \$1,680, being an average of \$240 per acre. Taking the usual acreage allotted to each hand, and putting the cost of cultivation the same as in other estimates, the profit on each person employed in making this crop was \$544.

The price of the best blue-grass lands ranges from \$100 to \$150 per acre. The very best soils, however, for

tobacco in Owen, Pendleton, and other contiguous counties, may be bought at prices ranging from \$20 to \$50 per acre, and inferior lands at about one-half these figures, the higher prices being for lands well improved and favorably situated. Rents are very much higher in proportion than lands. An acre of good tobacco land, capable of producing 800 pounds to the acre, will readily rent for \$12, while land producing 1,000 to 1,500 pounds will bring from \$18 to \$20 per acre.

Wages throughout the most populous portion of the district for farm hands by the year range from \$10 to \$15 per month and board, the former price being paid for boys from fifteen to eighteen years of age, and the latter price for well-trained men. By the day, in summer, the price paid for the same character of labor is 75 cents and \$1. On the outskirts of the tobacco-growing district the price for grown men by the year is \$140 and board; by the day, 75 cents. Those working "on shares" receive the same proportion of the crop as elsewhere in the southern states.

Strippers receive 75 cents per day, and packers and prizers \$1. Hogsheads are worth from \$1 75 to \$2 25, varying according to the convenience of timber and the kind employed.

Every important county has from three to eight redrying houses, in which local dealers receive the tobacco from the planters in wagons and prize it for market. Louisville and Cincinnati are the chief markets.

The only strips made in the district are put up at Carrollton, at the mouth of the Kentucky river. Two hundred and sixty thousand pounds of White Burley were made into strips at this point, which netted 75 per cent. of strips, a much larger percentage than is made from the heavier leaf at Henderson and at Owensboro', in the Lower Green River district. A few strips from White Burley are also made at Louisville for the English trade, the quantity, however, being inconsiderable, on account of the high prices of the leaf.

The light green of the White Burley leaf, approximating the color of the horn-worm, makes the task of worming somewhat more difficult than in other portions of the state. The greatest damage sustained by the tobacco of this district, however, is from house-burn, and from the imperfect protection afforded by open barns against harsh winds and drifting rains, inducing a very injurious mold.

The extraordinary increase in the production of this type of tobacco has outstripped the means provided for its proper protection while it is curing.

Screw prizes are used by local dealers, costing generally from \$50 to \$100, and beam prizes, such as are described in the chapter on Tennessee, are of frequent use among planters.

Few farming districts in the United States show a more general thrift than the region under consideration. There are but few private debts, and a manifest desire has been awakened among farmers to improve their estates by the erection of better houses and barns, and to preserve the fertility of the soil by a proper rotation of crops and by more judicious cultivation.

The following statement exhibits the total product and acreage of tobacco in the White Burley district for the years 1876 to 1879, and the average yield per acre for the latter year, only those for 1879 being from census returns:

	Pounds.
Product in 1876.....	30,909,433
1877.....	24,356,870
1878.....	23,966,253
1879.....	46,802,687
Acreage, 1879.....	53,474
Average yield per acre, 1879.....	876.36

CHAPTER VIII.

CULTURE AND CURING OF TOBACCO IN LOUISIANA.

HISTORICAL NOTES.

Tobacco, rice, and indigo were the principal staple productions of Louisiana a hundred and sixty years ago. About the time of the settlement of New Orleans the "Western Company" introduced the cultivation of the plant, and some quantity was grown as early as 1718. In 1752 its culture was encouraged by the offer of the royal government of France to receive into the king's warehouse all the tobacco raised in the province at the rate of 30 livres—equal to \$7—per hundred weight. The same encouragement was extended by the Spanish authorities in 1776. A greater impetus was given to its production in 1793 and 1794 in consequence of the ravages of insects upon the indigo plant, which was now abandoned for the more certain crops of sugar, rice, and tobacco. Only a limited area, however, was at that period planted in sugar-cane, and, as large capital was necessary for its production, many years passed before sugar became the distinguishing staple of the state. In the mean time the production of rice and of tobacco continued to increase. In 1802, 2,000 hogsheads of tobacco were exported from New Orleans, and its culture had become general all along the river as far up as Natchez, at least for domestic consumption.

At that early date the tobacco grown was not noted for any peculiar excellence. Cultivated upon alluvial soils, badly harvested, and cured in poorly-appointed houses, it presented a rough, bony appearance, though full of gum and highly charged with nicotine. Coming in competition, as it did from 1785, with the far better quality raised on the Ohio river, it gradually lost favor, and its production sensibly declined up to 1824.

THE FRENCH ACADIANS AND PERIQUE TOBACCO.

About this period a new process of curing was introduced by Pierre Chenet, a descendant of the Acadian French. These people, expelled in 1755 from Acadia, now Nova Scotia, adhering to their ancient customs, associating only with one another, have but few industries, and they live contented on the simplest food and with the plainest dress. They learned to cure tobacco in its own juices, as taught by Pierre Chenet, and in his honor have named the tobacco so cured *Perique*, though some claim the word to be a corruption of *peruke*, and that the peculiar method of curing was known much earlier.

WHERE THIS PECULIAR TOBACCO IS GROWN.

The cultivation of this tobacco is confined almost exclusively to the parish of Saint James, which lies about 50 miles above New Orleans, and is intersected by the Mississippi river, two-thirds of the parish being on the north and northeastern side of the river and the remainder on the south and southwestern side, the river here having a course southeast and east, and continuing in this direction several miles below New Orleans. The portion of the parish which lies east and northeast of the river is triangular in shape, with its northeastern apex resting on lake Maurepas, between which and lake Pontchartrain Pass Manchac forms a connecting link. The whole parish covers an area of about 330 square miles, and is nearly evenly divided between improved, unimproved, and swamp lands. The face of the country is level, interrupted occasionally by sloughs, bayous, and swampy lakes. Near the Mississippi river the land is more elevated, and slopes back gently for 2 or 3 miles to cypress swamps, which extend almost continuously in a line more or less parallel with the river. In the very midst of these swamps there are elevated spots, rising 4 or 5 feet above the general level. In consequence of this elevation they are well drained, and the soil is exceedingly fertile, being both calcareous and siliceous, and in its primitive state it is covered with dense canebrakes, above which tower the oak, the magnolia, the gum, and the hickory. The French and the Spanish pioneers of Louisiana were in the habit of driving their cattle to these places, during the season when other forage was scarce, to feed upon the canes, and from this circumstance they came to be known as *vacheries*, or "cattle lands". These spots are of frequent occurrence, and many of them have been cleared up and put into cultivation, one of the most noted of which is Grande Pointe. They are highly prized for their agricultural capabilities, and on them the best sugar-cane and the best tobacco are grown, their comparative freedom from the pestiferous and ineradicable coco-grass making them exceedingly valuable.

CLIMATE.

The climate of Louisiana is very mild and agreeable during the winter months, but rather oppressive in the hot months of July and August. The hot days are always relieved by heavy dews at night, thus securing vegetation, in part at least, against the parching effects of extreme dryness. The mean average temperature at Baton Rouge for twenty-eight years, from January, 1832, to December, 1860, was as follows: Spring, 68.90 degrees; summer, 81.26; autumn, 68.13; winter, 54.20; average, 68.12. According to the United States signal service the mean temperature at New Orleans from November 1, 1870, to October 31, 1880, was as follows: Spring, 69 degrees; summer, 81.8; autumn, 69.6; winter, 55.8. During this period the extreme range of the thermometer was 71 degrees, and the average range 32.

RAINFALL.

The reports of the signal service give the mean annual precipitation at New Orleans from November 1, 1870, to October 31, 1880, at 65.44 inches, and at Shreveport for the period extending from September 1, 1871, to October 31, 1880, at 49.97 inches. The mean of the prevailing winds at New Orleans for the period embraced by the observations of the signal service was southeast, and at Shreveport south.

SOILS NOW CULTIVATED IN TOBACCO.

For growing tobacco two varieties of alluvium are employed: the gray soils, which lie immediately on the eastern or northeastern bank of the Mississippi, and the magnolia soils, which occupy the gentle eminences amid the swamps, known as *vacheries*. The soil preferred for tobacco is the last, which is a dark, sandy loam, highly calcareous, easily worked, and producing a style of tobacco silky in texture, medium in size, and of a flavor superior to that grown on other soils. Black lands, mixed with yellow sand, are next in point of superiority for producing tobacco. The clayey lands, however, are said to make tobacco of greater strength, but lack the silky texture and delicate fiber. The black lands, if well drained, are excellent for tobacco, provided they have sand enough in their composition to make them friable. When there is a lack of sand, these lands compact so closely that they are difficult of tillage, and the plant does not grow with the most healthful vigor.

THE PERIQUE TOBACCO DISTRICT.

There are two principal centers in Saint James parish around which the Perique tobacco is grown and prepared for market. One of these lies immediately upon the Mississippi river, the post-village, Convent, being about the middle of the belt. On each side of this place the land is divided into small farms, each with a frontage of a few hundred feet on the river, and running back so as to embrace 10 or 12 acres. Only about 12 arpents were cultivated near Convent and 65 at Grande Pointe in 1879. A considerable quantity of the tobacco grown around Convent is used in the manufacture of cigars, but its texture and flavor are not equal to that grown on the elevated lands beyond the swamps. This is owing, no doubt, to the stiffer nature of the soil and to the hurtful influence of the coco-grass or nut-grass (*Cyperus rotundus*, var. *hydra*), which no amount of labor can destroy.

Grande Pointe, already mentioned, is famous for the excellence of its Perique tobacco. It occupies an insular position beyond the swamps, and is about 3 miles from the Mississippi river. The river in its course, after leaving Convent, runs east, which makes Grande Pointe lie to the north. The land of this *vacherie* is owned by fifteen proprietors, fourteen of whom own 12 acres each, and the remaining one about 50 acres, making in all 218 acres. A dense growth of cane and lofty trees, hanging with tufted mosses, surrounds the settlements. Red oak, cottonwood, ash, black gum, persimmon, live oak, sassafras (which is here a tree in size), and magnolia are found growing on elevations of from 3 to 5 feet above the swamps which surround the place. Cypress trees abound in the swamps and on the oozy lands which girdle the swamps.

The first settlement made at this point was in 1824. The land was divided into small holdings, and has been cultivated every year since. The amount cultivated in tobacco at present is 64 acres, or about 77 arpents—an arpent being 4,088 square yards, or nearly five-sixths of an English acre. The amount raised in this locality does not exceed 20,000 pounds in any one year; for the year 1879 it was 14,680 pounds. The whole crop of Perique tobacco grown in Louisiana is not over 48,000 pounds, that grown at Grande Pointe making usually five-twelfths of the whole; and yet the Perique tobacco is known throughout the markets of America and of Europe. About three-fourths of the product of the state is made into Perique rolls; the remainder is used in the leaf.

PECULIARITIES OF THE PERIQUE TOBACCO.

Seed from Kentucky or from Tennessee makes a tobacco too rich and too large to cure well, but if sown for several years in succession it gradually assumes the type of that grown from the native seed. The old Perique has a fine fiber, medium leaf, and small stems. It is strong, rich, gummy, tough, and dark, with a shining luster, and when taken from the presses its glossy appearance is strikingly beautiful. Because of its strength, it is largely intermixed with milder kinds and made into smoking-tobacco and cigarettes, and by those accustomed to it it is sought for chewing purposes.

GRADES OF PRODUCT.

There is a material variation in the quality of this variety of tobacco grown on different soils. When grown on a sandy loam, it has the delightful aroma so much prized, and this aroma decreases in strength as the amount of clay in the soil is increased. There are three grades into which it is made:

1. Robe, or the most perfect leaves, which are used for wrappers, constitutes 10 per cent. of the crop.
2. Good leaf, which forms the fillers for chewing-tobacco. The proportion of this grade is about 50 per cent.
3. Smokers, which amount to 40 per cent. of the crop, and are made out of the lower leaves, which are usually bespattered with dirt.

The proportion of good tobacco has decreased during the past decade, owing to the great reduction in the price of the Perique. Ten years ago a *carotte* of 4 pounds brought in the market from \$5 to \$10, according to the grade; but the same can now be bought for less than \$2, with 64 cents deducted for tax, to which Perique tobacco, by the decision of the commissioner of internal revenue, is subject. This has had such a depressing effect that the tobacco area in the Perique region is constantly diminishing. (a)

DECREASE OF TOBACCO PRODUCT AND CAUSES.

The acreage of the tobacco crop of 1879, as compared with that of 1876, shows a decrease of 40 per cent.; with 1877, of 50 per cent.; with 1878, of 33 per cent. The yield per acre, however, in 1879 was greater than in 1878, but 10 per cent. less than in 1876 and 1877. The crop of 1879 had twice as much good tobacco as that of 1878, but of much the same quality as the crops of 1876-77. While the amount produced per acre has probably been increased during the past decade, in comparison with the decade preceding, it is not managed so nicely as it was when prices were higher. At one time every leaf was brushed and cleaned, so great was the ambition of the farmers to excel; now no such pains are taken, and, as the disposition to abandon its cultivation grows stronger every year, less and less pride is taken in its manipulation.

a A bill (Senate 390) provided that "Perique tobacco may be sold by the manufacturer or producer thereof, in the form of *carottes*, directly to a legally qualified manufacturer, to be cut or granulated and used as material in the manufacture of cigarettes or smoking-tobacco, without the payment of tax". This passed the Senate April 6, 1882, but failed to become a law during the session.

SOILS AND MODES OF CULTIVATION.

A very small quantity of freshly-cleared land is put in tobacco, the old lands being preferred, because the soil is more easily prepared. On new lands the tobacco has larger stems and fibers; the texture is coarser, and it has a strong acrid taste. For making sweet tobacco old lands are best; for quantity, new lands. Some blood fertilizers and cotton-seed meal have been tried, but they tended to make the tobacco coarser, while the flavor was impaired. Lime, spread broadcast upon a pea fallow, increases the yield about one-fourth, but impairs the quality. If the soil is put in tobacco for several years in succession, without fertilizing with pease, no difference is perceptible in the yield for the first two years, but there is a very perceptible diminution in the quantity the third and succeeding years. The quality, however, improves in both sweetness and texture. After the third year the superior quality scarcely compensates for the loss in quantity. The yield was 25 per cent. greater per acre in 1879 than it was in 1869. It is only within the present decade that pease have been introduced and used to increase the fertility of the soil. On old land, ten years ago, sixty *carottes* of 4 pounds each was about the average yield per arpent, but with the constant use of the pea crop as a fertilizer a product of 75 *carottes* per arpent is now common. When the tobacco is taken off, in June or July, one bushel of pease is sown to the arpent, and the vines are not turned under as a green crop, but are cut and taken off for hay when the small pods begin to form. It is claimed that the pea vines shade the land during the heated term, and this improves it, leaving it mellow and loose for the succeeding crop of tobacco.

SEED-BEDS.

The soil is not burned, but is highly manured with cow-dung, which is put on 6 inches thick and turned under with a spade or a plow; after this the bed is well worked with a hoe and a rake until the soil is thoroughly pulverized. The manure is applied to this bed in October and turned under; and during the latter part of December the bed is again worked, and channels are cut through it every 3 feet, so as to secure drainage. The seed, after being mixed with ashes, is sown about the 1st of January or the last days in December, and the bed is beaten with the back of a spade or pressed by a roller. When the plants begin to appear the beds are covered with palmetto leaves, so as to protect them against the frosts of February, and when the leaves are about 2 inches in length they are drawn and transplanted in the fields, and the seed-bed is plowed and sown with pease, which remain on it until October, when preparation begins for another year. The same spot is used for five or six years in succession, and is only abandoned when the coco-grass or Bermuda grass takes complete possession of it. When the land intended for seed-beds is burned it becomes too light and porous, and the plants die out under the scorching rays of the sun.

PREPARATION OF THE SOIL AND CULTIVATION.

The tobacco soils in Louisiana are very deep, and, though somewhat compact on the river lands, are very friable on the elevated uplands, among the swamps. In the month of January the land for tobacco is plowed to the depth of 6 or 8 inches, care being taken that it is sufficiently dry to work. If plowed too wet, and a hot sun supervenes, the river land, and especially the black, sticky soil, will bake as hard as a sun-burned brick, and no amount of labor will render it pulverulent until the ameliorating influences of the frosts have decomposed the hard lumps. The soil is usually reversed with a turning-plow, and the subsoil-plow is only used after the tobacco has been planted to break out the middles at the last plowing, and thus to secure good drainage. No cultivated plant is more susceptible to the injurious effects of an excess of water in the soil than tobacco. When overflowed, though the water may retire within a few hours, the plant immediately wilts and gradually dies. Another plowing is given the soil about the middle of February by running furrows from 4 to 5 feet apart, and two more furrows with a turning-plow, thrown on each side of the initial furrows, thus forming a series of beds. Toward the end of February, when the soil is in good condition, a horse-rake is run along the tops of the ridges, giving each a wide, level top. After this beds are thrown up on the tops of the original ridges with a one-horse plow, four furrows together. With a hand-rake the tops of these are raked off, and the land is ready for planting. The plants are then set out 3 feet apart on the beds after a rain, but in seasons of drought it is often necessary to water each plant a day or two after it is transplanted. The planting usually takes place about the last week in February and the first week in March, though the time may be extended to April, or even to May. The usual distance between plants is 3 by 4 feet, making 12 square feet to each plant, thus giving 3,630 plants to the acre, or a little over 3,000 to the arpent. The distance between the rows, however, varies from 4 to 4½ and 5 feet, according to the character of the soil, the wider distance being used on very fertile soils. No effort is made to make the plants align across the beds, as the cultivation is all done one way, and the water furrows are carefully protected, so as to take away any excess of moisture from the immediate vicinity of the plant. The cultivation of the crop is very simple, but frequent, as in the semi-tropical climate of Louisiana grass grows with remarkable rapidity. A subsoil-plow, after the plant is well rooted, is run on each side of the row to the depth of 8 or 10 inches. A *piochon*—a combination of the harrow and the cultivator—is then used to pulverize the soil between the rows, after which hoes are employed to scrape out any grass that may remain in the narrow belt which is left untouched between the plants. As often as it rains this

triplex process of cultivation is pursued until the tobacco is nearly large enough to top. At that time the dirt is thrown to the plant with a one-horse turning-plow, followed with the hoe, by which the dirt is more carefully disposed about the stalks. The middles are then opened with a subsoiler, and the cultivation is finished. Should grass shoot up after this, it will rather be an advantage than a disadvantage, as without it the lower tobacco leaves are liable to be splattered with dirt during heavy showers.

PRIMING AND TOPPING OF TOBACCO.

The tobacco plant is not "primed". In the Perique region about the 15th of May the seed-bud is pinched out, leaving from twelve to eighteen leaves on each plant. The time, however, for "topping" varies with the soil, and on sandy lands is from one to two weeks earlier than upon stiff, cold, argillaceous soils.

SUCKERING OF TOBACCO.

One week after topping the suckers are pulled off and diligent search is made for the green worm. This process must be repeated every week until the tobacco ripens, which is usually from four to five weeks after it is topped. It is said that in the climate of Louisiana three suckers will come out in succession to every leaf, which is not the case in the colder climates of the middle and Atlantic states, where two suckers to the leaf is the maximum.

RIPENING TOBACCO.

In the latter part of June or early in July the tobacco plants, if well cultivated, will show a yellowish, mottled appearance, the leaves being very crisp and easily broken. After it is ripe, heavy rains, followed by hot suns, often injure the crop by scalding. Heavy dews are beneficial, as the secretory organs of the plant are rendered more active in storing up in the vesicular structure the rich juices and gum that give flavor and strength to the cured product.

CUTTING AND CURING OF TOBACCO.

Contrary to the practice in other tobacco-growing regions, the plants are cut during the hottest part of the day and taken immediately to sheds. The stalk is not split in cutting, but is severed with a hatchet about 3 inches above the ground, leaving from two to three of the lower leaves on the stump, which are thought to be worthless on account of the large amount of dirt adhering to them, they having served their purpose in keeping the other leaves free from sand and dirt. After the tobacco has been taken to the sheds a number of boys and girls are kept busily employed in sharpening pieces of cane from 3 to 4 inches long. These are driven one into each stalk near the lower end, at such an angle as to form a hook. By these hooks the plants are suspended upon a series of ropes stretched lengthwise in the shed, these ropes being a foot apart, and the plants on the ropes 6 inches from each other. As the plants wilt the distance between them is lessened. Now begins the peculiar manipulation of the Perique tobacco. As soon as the leaves become embrowned, and while the stem or midrib is yet green, each one is carefully picked from the stalk and the green stem is pulled out. The first leaves are pulled off in about ten days from the time the tobacco is put in the shed, and from one to three leaves at intervals of a few days, until the whole stalk is stripped. As fast as the green stem is pulled out the leafy parts are made into loose twists, each twist containing from twenty to thirty half leaves. These twists are packed in boxes 11 inches square, capable of holding 50 pounds, which, when nearly full, are put under a simple lever press, the lever being 12 feet long, to which weights are attached, so as to secure a pressure on the tobacco of 7,000 pounds to the square foot. Screw-presses are never used, for the reason that a continuous pressure is required in curing this tobacco. After remaining in press for twenty-four hours it is taken out, opened, and thoroughly aired for a few minutes, until the exuded juices, black, tarry, and thick, can be reabsorbed, when it is again placed under pressure. This treatment is continued with each box for ten days in succession, every twist being opened, aired, and turned, so that the juices will saturate the whole mass. From a light brown the tobacco grows darker each day, until it shines in oily blackness. After ten days the manipulation becomes less frequent, once in three or four days being sufficient. At the expiration of three months the tobacco is cured and emits a rich, spirituous flavor, which has been imparted to it by the reabsorption of the aerated juices. Perique tobacco is cured and preserved by the resinous gums contained in the natural leaf. The robe or wrapper leaves are handled with great care, and are kept in twists by themselves while being cured under pressure.

The next step is to put the tobacco into cylindrical rolls, or *carottes*, containing usually 4 pounds, though two, and even one pound *carottes* are made for home consumption. To do this the tobacco is taken from pressure, and each leaf is opened, straightened, and aired. Then a cloth, 24 inches long and about 15 inches wide, is laid upon a table and covered with robe leaves, the bottom side of the leaf being turned uppermost, and the fibers so disposed as to run to a point in a longitudinal median line of the cloth. A mat of leaves is then placed on the layer of robe, a half inch or more in thickness, and extending nearly to the edges of the underlying cloth. A second cloth is

laid over this mat, and the tobacco is compacted by tramping, after which the ends of the mat are doubled over about three inches at each end and tramped again. The whole mass—cloth, robes, and fillers—is then rolled into a cylinder 15 inches long and about 3 inches in diameter, a hole being kept through the center, into which the ends of the robe leaves are tucked. The ends of the cloth are now tied and a rope wound in a coil about the *carotte* from end to end with a windlass made for the purpose.

This rope is taken off at the expiration of twenty-four hours and again wound more tightly around the *carotte*, when it is ready for market. A man of ordinary skill can put up ten *carottes* a day with



a boy to assist at the windlass. The making of *carottes* is generally the work of winter and leisure days, and employs every member of the household in taking the tobacco from the presses, opening, straightening, and weighing it, preparatory to the rolling, which requires considerable tact and skill in the operative. The tobacco often remains in the boxes under pressure for twelve months or more, growing sweeter with time, and is only put into *carottes* when there is a demand for it, or when the planter desires to sell.

COST OF PRODUCING AND MARKETING TOBACCO.

The cost of raising and marketing Perique tobacco probably exceeds that of any other tobacco grown. The value of the land on which it is cultivated is estimated at from \$30 to \$50 per arpent, the rental value of which is \$5 a year. Wages for workers in tobacco amount to 75 cents and \$1 a day and board, the latter reckoned at 75 cents a day. The following estimate for a crop on 4 arpents of land was made at Grande Pointe:

Dr.	
Rent of 4 arpents of land, at \$5	\$20 00
One man five months, at \$20 per month	100 00
Two men one month, at \$25 per month	50 00
Three men one month, curing, etc.	75 00
Rent of shed, 10 per cent. on \$200	20 00
Boxing	4 50
Putting up 300 <i>carottes</i> , at 10 cents	30 00
Rope for wrapping, 10 cents per <i>carotte</i>	30 00
Internal-revenue tax-stamps	192 00
	<hr/> 521 50
Cr.	
By 300 <i>carottes</i> , 4 pounds each, at 41 cents per pound	492 00
Loss for each four arpents cultivated	29 50
	<hr/> <hr/> Actual cost of production, exclusive of tax, 27½ cents per pound.

The growing of Perique tobacco would cease entirely but for the fact that women and children do a large part of the work when they could not be profitably employed at any other industry. The growers of Perique have very small farms, and can produce no other crop on the same amount of land that will give them regular employment. While there is no profit in making tobacco, by its culture they are able to get a fair average compensation for the time employed.

It will be observed that the yield per arpent at Grande Pointe is 75 *carottes*, or 300 pounds, equivalent to 360 pounds per acre; but the stem, which makes 25 per cent. of the weight of the leaf, must be added, which will give 480 pounds per acre. There is also a shrinkage of 20 per cent. in the process of curing, which will make the actual yield per acre 600 pounds as the product is usually estimated. The maximum production is 30 *carottes* to the 1,000 plants, about 92 to the arpent, or 109 to the acre. Compared with the yield of a ton or more per acre in Pennsylvania and the Connecticut valley, this appears exceedingly small. The production per acre can easily be increased to 1,000 or even 1,500 pounds by the application of strong fertilizers in sufficient quantity, but the increase in yield will be at the expense of quality. The peculiar sweetness and flavor of the Perique would be destroyed, and with the destruction of these qualities it would take rank among the lowest grades of American tobacco.

DISEASES OF TOBACCO.

FIRING, OR BROWN RUST, is one of the few diseases to which tobacco in Louisiana is subject, and occurs occasionally, but not to such an extent as to work serious injury to the crop. During excessively hot, wet weather in June or July the disease manifests itself. The leaves nearest the ground will sometimes dry up and others become spotted, and occasionally, during the prevalence of heavy rains, accompanied by strong winds, they are turned over, and the drops of rain will bruise the under surface. These bruised spots become "rusted" in a few days, and if the plant is not cut the whole leaf will become involved.

SUNSTROKE.—When the soil upon which tobacco is grown is not well drained the presence of water in excessive quantity, accompanied by a hot sun, will produce "sunstroke", the effect of which is first to wilt the leaf, which afterward blackens and dries up in the field if not cut.

BIZONE.—The disease known in North Carolina as “waterloon”, and in Kentucky and Tennessee as “walloon”, and “frenching”, akin to the last, occur on close, compact, wet soils.

Draining the land thoroughly is the best remedy for the prevention of all these diseases.

INSECTS.

Insects have rarely been troublesome to the tobacco plant in Louisiana. In the spring of 1880 the flea-beetle was very destructive to young plants, but never before within the memory of the tobacco-growers. In a climate so mild, and where vegetable life is so profuse, it might be expected that cut-worms would be very destructive, but such is not the fact, the very abundance of vegetation acting as a protection to the tobacco plant. Nor are horn-worms troublesome upon the varieties of tobacco grown for Perique. It is an easy task for one man to keep ten thousand plants clear of these pests. Bud-worms, which are small, greenish, and white striped, and when grown are less than an inch in length, are much more troublesome, and require constant and unremitting search until the tobacco is topped. When they attack the bud of the plant they pierce the embryotic leaves through and through and completely check their development. But while the green-worm (*Sphinx carolina*) does not attack with vigor the tobacco grown for working up into Perique, it is very destructive to the sweet-scented varieties, such as Havana, Brazil, and Yara, and if either of them is planted in a row beside the Perique the worm will devour the first and scarcely touch the second.

INJURY FROM STORMS.

About once in six years the tobacco in the field is injured by hailstorms. In this latitude, however, hailstorms occur about the time of the vernal equinox, and the tobacco plant has abundant time to mature after the period for storms has passed.

VALUE OF TOBACCO PRODUCT.

The average value per pound in Saint James parish for Perique is about 41 cents, including a duty of 16 cents per pound. The value per pound of the different grades is, including duty: Chewing, 46 cents; smoking, 36 cents; robe, 56 cents. The latter tobacco sometimes brings a fancy price, but is rarely ever sold alone, and is generally consumed in wrappers for the other two grades.

PECULIARITIES AND SPECIAL USES OF THIS VARIETY.

Nearly the entire product of the Perique region is taken by manufacturers, and is by them treated as raw material. They make it into fine-cut, in which form it has a glossy appearance, totally different from any other fine-cut tobacco. This gloss or varnish is due to the superabundance of juices, which steep and saturate the *carotte*, and so securely are they sealed up that no vicissitudes of climate or season are able to diminish them. The fine-cut, in its turn, is manufactured into cigarettes, and the tobacco to a very limited extent into cigars. It is also packed in paper packages, tin cans, and glass jars for use in the pipe, and is also used to mix with weaker kinds of tobacco, by which the flavor, but not the strength, of the Perique is preserved. A very small quantity is made into snuff, which by a French gentleman of the old régime is preferred to any other kind.

POINTS OF EXCELLENCE.

The great points of excellence claimed for Perique tobacco are—

1. Its great strength. It has a large content of nicotine, amounting to 4.32 per cent., and more sweet juices than any other kind. It is therefore valuable for mixing with lighter and weaker types.
2. It is free from the acrid, biting, creosotic taste so common in other kinds of southern-grown tobacco, and has a rich, fragrant odor, combined with a smooth, delicate taste.
3. By men of literary habits it is said that Perique tobacco stimulates the action of the brain, and that its narcotic effects are less than those of any other sort of tobacco. Men of vigorous constitution affirm that it produces an exhilaration of spirits akin to that which comes from drinking good old wine, without the disagreeable results too apt to follow the use of the latter stimulant.

In this report upon the tobacco of Louisiana attention has been directed mainly to the product of Saint James parish, for the reason that this parish puts up the best Perique made in the state. A small quantity is made in Winn, Avoyelles, and De Soto parishes, and it was formerly grown to a limited extent in Lafourche, Terrebonne, and Natchitoches, but in quality is said to be far inferior to the Perique of Saint James.

By far the larger portion of Perique tobacco finds a market at the various little stores that line the banks of the Mississippi in the region known as “the coast”. The people who raise and cure it use it as a species of currency, the country merchants accepting the *carotte* as so much money, agreeing to stamp each one before it is delivered, deducting the value of the stamp from the actual selling price. When a considerable number of *carottes* has accumulated at the storehouses they are shipped to New Orleans and sold to some wholesale dealer, who in turn supplies the demand from New York and other points. The compact bundles into which the tobacco is put make it very convenient for handling.

OTHER TOBACCO.

The growing of Cuba tobacco has been frequently tried on the gray soil along the river banks, but with indifferent success. Grown from seed imported from Havana or Vuelta de Abajo, it emits a pleasant odor while growing, and when properly cured the first year from the seed is no mean substitute for the Cuba-grown tobacco; but each succeeding year it shows a gradual decline in fineness of texture and sweetness of flavor, until it approximates in size and general appearance the Perique tobacco, but never attains the peculiar spirituous flavor of that variety. The difficulty of procuring fresh seed from Cuba every year, and the inexperience of the planters in handling and curing the Cuba tobacco, together with the want of an established market for home-grown Cuba, have repressed its cultivation.

PRODUCTION OF TOBACCO.

Assuming that three-fourths of the product of the state is raised for sale and the remainder for the individual consumption of the producers, the latter being generally a fixed quantity, the following statement will give, approximately, the production, acreage, and yield for the several crops grown from 1876 to 1879, inclusive, the figures for 1879 being taken from the census returns:

Year.	Production.	Acreage.	Yield per acre.
	<i>Pounds.</i>		<i>Pounds.</i>
1876.....	94,248	390	238
1877.....	100,950	402	238
1878.....	74,210	302	205
1879.....	55,954	253	221

The price of tobacco grown in Louisiana is so irregular that it is impossible to arrive at anything like a satisfactory result as to values. When put up in *carottes*, the price ranges, without the tax, from 20 to 60 cents per pound; in the leaf it sells from 5 to 20 cents per pound. A considerable part of the product is consumed by the producer, so that any attempt to fix the value would be deceptive, although some dealers estimate that 18 cents per pound would probably approximate the average value for all grades.

CHAPTER IX.

CULTURE AND CURING OF TOBACCO IN MARYLAND.

We have no historical account of the precise date of the introduction of tobacco into Maryland, nor of its first culture by that colony. It is probable that the first planters were William Claiborne and his associates, who emigrated from Virginia and made the first settlement in the state on Kent island (now a portion of Queen Anne county) in 1631, just one year before the charter under which Maryland was permanently established was granted by James I to Cecilius Calvert, second Lord Baltimore.

For a long time in Maryland, as in Virginia, excessive efforts to produce large crops of tobacco and the neglect of home supplies brought scarcity, and consequent distress.

The culture of tobacco at an early period extended over eastern and southern Maryland, and for a long series of years the counties on the eastern shore of the Chesapeake bay were large producers. As late as 1849 Queen Anne county raised 8,380,851 pounds, and Somerset county 1,763,822 pounds. In 1869 Queen Anne raised none, and Somerset 14 pounds. No other county on the eastern shore raised any tobacco in 1869, except Wicomico, 370 pounds, making the product of this district of the state 384 pounds, where more than 10,000,000 pounds had formerly been raised. Other crops, giving quicker and better returns, have completely ousted tobacco from this portion of the state, which is so admirably adapted to truck farming that it will probably not produce tobacco again as a staple crop.

The amount produced in Maryland has fluctuated widely. Before the Revolutionary War it rose to 20,000 hogsheads; at the end of that war it did not exceed 10,000 hogsheads, since which time it reached 51,000 hogsheads in 1860, descended to 27,064 in 1868, and rose to 27,782 in 1869.

The peculiar characteristics of nearly all Maryland tobacco afford it only a limited field of consumption. It is used only by smokers of the pipe, who are contented with a cheap article, and is consumed chiefly by the peasantry of Germany and Holland, who cannot afford to pay for a richer tobacco, and who would smoke their home-grown weed were not the Maryland leaf the cheaper of the two. A marked characteristic of Maryland tobacco is its mildness.

There are some fine Bay, Burley, and cigar-leaf tobaccos raised in Maryland. The soils are capable of producing a much larger proportion of the finer types than has generally been grown, requiring, of course, a change of varieties and appropriate management.

Nearly all the tobacco grown in Maryland is produced in the counties of Anne Arundel, Calvert, Carroll, Charles, Frederick, Howard, Montgomery, Prince George's, and Saint Mary's.

There are three distinct types grown: Air-cured, Red and Yellow Bay, and Spangled Bay.

Air-cured tobacco constitutes fully four-fifths of the total product, and is grown in the district composed of Saint Mary's, Charles, Calvert, Prince George's, Anne Arundel, and Howard counties.

The Red and Yellow Bay and Spangled Bay are produced in Montgomery, Frederick, and Carroll.

In portions of Carroll, Cecil, and Harford small patches of cigar tobacco are cultivated, the product finding a market in Pennsylvania.

Hailstorms in summer are not of frequent occurrence, and when they appear it is usually in narrow belts, causing but partial damage in contracted areas. Wind storms, occurring about the autumnal equinox, sometimes cause considerable damage, particularly when they are violent and occur before the 22d of September. Heavy rains occasionally inflict great injury, drowning some and washing away other portions of the crop, and bespattering all with mud and sand.

GEOLOGY.

Saint Mary's, Charles, Calvert, and portions of Prince George's and Anne Arundel are of Tertiary formation, the northern portions of Prince George's and Anne Arundel are Cretaceous, and the other tobacco-producing counties are primary. The soils of the three states of Virginia, Maryland, and New Jersey are strikingly similar in many respects, and this is especially true of the light gray, micaceous, and feldspathic soils. For the cereals and many other crops they are considered poor, but good for certain types of tobacco. This class of lands is attracting more attention as their capabilities for improvement are becoming better known. Of these soils a recently published *Geology of New Jersey* says: "It is observed that the rocks are in many places subject to decay, and that in such localities the soil is susceptible of high cultivation." The following are given as analyses of specimens of such soils, the same mentioned above as being common to Maryland and Virginia:

	Soda feldspar.	Potash feldspar.	Soda and lime feldspar.
	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
Silica.....	68.6	64.6	62.1
Alumina.....	19.6	18.5	23.7
Soda.....	11.8		
Potash.....		16.9	
Lime.....			14.2
	100.0	100.0	100.0

TOPOGRAPHY AND SOILS OF THE SEVERAL COUNTIES.

SAINT MARY'S.—The southeastern portion is low and level; the northwestern undulating. The soil, originally a rich, black mold, has been impoverished by continued cultivation, without rest or manuring; but it is gradually improving under the free use of lime, with better management.

CHARLES.—Like Saint Mary's, generally low and sandy, but rolling enough to drain well. Soils once rich, but now greatly worn by excessive cropping without manure.

CALVERT.—Level or gently rolling. Soils, sand and clay loam; quick and productive where not too much exhausted.

PRINCE GEORGE'S.—Lands generally lie well, and were once very rich. Though worn, they produce well with a little help. The best soils are a clay and sand loam.

ANNE ARUNDEL.—Southern part level; northern rolling. Above Annapolis the soil is light gray and not considered productive; below that city the lands are richer, darker in color, stiffer, and more clayey.

Nearly all the soils of the five counties above named are alluvials, and were originally very productive.

HOWARD.—General surface undulating, and the soils of the southern part are very much like those above described. In the west and northwest of the county the formation is primary, and the soils are more like those of western Maryland and middle Virginia. There are narrow belts of limestone running through the county, upon which the soil is productive and susceptible of high improvement.

MONTGOMERY.—Rolling and hilly, and the soils vary as greatly as the geological formations upon which they rest. The eastern part of this county is primary, the rocks mostly gneiss, mica, and hornblendic slates, and the soils are mostly light and sandy, with clay subsoil. Though not rich, they can be made to grow paying crops of tobacco by the aid of manures. The western portion is talcose slate, with areas well adapted to tobacco, the poorest soils producing the finest grades.

FREDERICK.—Rolling, almost mountainous; well drained. Has a variety of soils—limestone, granitic, gneissoid, and slaty. The sandy and slaty soils are the best for tobacco. Here, as in Montgomery, the poorer soils produce the finest tobacco.

CARROLL.—Undulating and hilly; geology primary; soils variable. Those on the slopes and foothills of Parr's ridge are best suited for tobacco.

Although western Maryland produces a type that sells higher than that grown in the southern and eastern portions of the state, very little tobacco is raised there, farmers preferring other crops.

The soil varies in depth from 3 to 8 inches on the rolling lands in the upper or "bay" district, and from 6 to 12 inches or more in the southern alluvial district. The lands of the rolling or hilly sections are generally of easy tillage, and are more or less liable to wash. In southern Maryland the land lies well, except immediately on the creeks and rivers, where it is swampy.

In Prince George's, Anne Arundel, and generally in the counties of the air-curing district, tobacco is planted upon almost all classes of soils, farmers usually selecting the most fertile lands. In Prince George's county light clay hillsides, made rich with manure after clover fallow, are preferred when new lands are not to be had. The product is much better upon new lands, but such soils are now exceedingly scarce. In Anne Arundel county a clay loam, or a dark loam with clay subsoil, is preferred; in Montgomery a light-red soil is usually chosen. In Howard a rich, dark, sandy, or clay loam is preferred where quantity is the object; but if quality is sought the preference is given to gray, rolling lands, fertilized. Throughout the tobacco section all classes of arable lands are planted.

The original forest growth of the best tobacco soils is now very scant, most of it having long since disappeared to make room for crops, or for fuel, rails, lumber, etc. What remains is composed of oak, chestnut, locust, pine, etc.

VARIETIES OF TOBACCO CULTIVATED.

Varieties are often named from some peculiarity of growth, habit, or appearance of the plant, as Broad Leaf, Narrow Leaf, Twist Bud, etc., or take their names from individuals who have made some marked success in producing them, as Wilson, Turner, etc.

Broad Leaf, grown in Prince George's, and perhaps in other counties, is tall, with the leaves broad, and not very many on the stalk; is chaffy and rather light in weight; cures a pretty color, burns easily, and is liked by many planters.

Narrow Leaf, grown in Prince George's, Anne Arundel, and Montgomery counties, is not very tall; has many leaves, thickly set on the stalk. The leaves are narrow, but heavy, cure a pretty red, are thick and fine, and grow larger upon rich land. Some planters in Montgomery claim that a better article can be grown of this variety than of any other; but it does not, however, bring as good a price as the lighter sorts.

Baden, grown in Prince George's county, sometimes called "poor-land tobacco", cures a beautiful whitish-yellow, but is liable to greenish spots or stripes on the leaves, which lessen its value. The leaves are short, light, and chaffy. If the weather is favorable when it is first cut and put into the barn, it cures a fine yellow and outsells other sorts.

White Burley, grown to some extent in several counties, is much liked by those who have tried it. It requires strong land, cures better than most other varieties, can be cut before maturity, and yet retain its color.

Pear Tree, more generally known as Boyer, grown in Montgomery county, where it is the principal variety cultivated; Wilson and Five-Sucker, grown in Anne Arundel; Thickset, grown in Calvert, are varieties locally popular. A new variety, called White Kentucky, was introduced into Calvert county in 1869. This variety cures well and is popular, the only objection to it being that it requires a very rich and highly-manured land to grow it to proper size. In Howard county the Burley, the Connecticut Seed-Leaf, and the Maryland, the seeds of which varieties were sent to that county by the United States Agricultural Department, have been grown to considerable extent. The Maryland is thrifty, of quick growth, sometimes reaching a height of six feet; is not as fine and as good as the Burley, but is more prolific. Connecticut Seed-Leaf is successfully grown in Howard for pipe-smoking and cigars.

Tobaccos grown upon lands rich in vegetable matter are generally of a poor quality, large, coarse, dark in color, and light and trashy. When grown upon thin lands, dressed with stable manure broadcast and fertilized in the drills with a proper quantity of good superphosphate, they are of a better and more salable quality, and when raised upon new lands they are of the first quality. On the sandy bottoms of the lower country—Prince George's, Saint Mary's, Charles, and Calvert counties—the tobacco is duller in color and heavier than that produced upon the micaceous soils of Howard. Light dry soils and sandy loams produce light-red and yellow tobaccos of the finest quality and highest price, and heavy, dark loams yield darker grades and more weight, but of inferior quality and of small value.

TOBACCO FERTILIZERS.

In southern Maryland commercial fertilizers are used on about one-fifth of the area cultivated in tobacco. These are kainit, phosphates, and various special manures, manufactured in Baltimore or sold there. Fertilizers are applied in quantities varying from 100 to 400 pounds per acre, either broadcast or in the drill, at a cost of from \$3 to \$12 per acre.

In the Bay district nearly all the tobacco lands are manured with domestic or commercial fertilizers, or both. From 250 to 400 pounds of commercial manures are applied, usually in the drill, at a cost of from \$6 50 to \$10 per acre.

The use of fertilizers, generally ammoniated superphosphates, or special compounds manufactured and sold as tobacco manures, increases the yield very materially, especially in favorable seasons; but this increase of weight is almost always attended by a depreciation of quality. Tobacco grown without the help of these fertilizers does not mature quite so early, but is more pliable, keeps in order better, and has more body. Upon the dark loams of Charles county commercial fertilizers have produced little or no effect; but plaster, lime, and ashes have given favorable results, increasing the yield, but without any appreciable improvement of quality.

In the Bay district fertilizers are considered indispensable, and are generally used only in connection with farm-yard and stable manures. In Howard county good farmers do not attempt to raise any crop without manuring and the use of fertilizers. In Prince George's, and in some portions of other counties of southern Maryland, the effects of fertilizers are rarely seen after the first crop to which they are applied. If none are used upon succeeding crops, there is an immediate falling off in the yield, which will continue unless the soil is manured or improved by judicious rotation. In Calvert county an experiment was made upon a certain field by planting it for six years successively in tobacco, and the yield for the sixth year was as good as that for the first, but there was a marked depreciation in the quality. In southern Maryland are large areas of land, which have been planted in tobacco at recurring intervals for more than a hundred and fifty years, still capable of producing a fair crop without fertilizers, and this upon soils upon which manures have never been used—an evidence of the remarkable natural fertility of these particular soils.

The yield of tobacco has decreased from 10 to 25 per cent. during the last ten years in Prince George's, Calvert, and Charles counties. In Anne Arundel county some planters have succeeded in producing larger crops than formerly, while the majority confess to a gradual lessening of yield. The general decrease in the counties above named is attributed to the failure of clover for several years during the decade, and the rather stinted use of home-made manures as one of the consequences of that failure. In Montgomery county the yield has increased from 10 to 12 per cent.

In Prince George's, Calvert, Anne Arundel, Montgomery, and Howard counties wheat usually follows tobacco. Clover alone, or clover and grass seeds, are sown upon the wheat lands, to remain two or more years, when the land is again put in tobacco. In Charles county a favorite method is to sow rye after tobacco; then pease or buckwheat, to be limed and turned down for wheat; then clover, to stand two years; then tobacco again. The best farmers use plaster upon clover, and bone dust and kainit upon wheat in the rotation. Some sow cow pease, a bushel and a half per acre, at the last plowing of the tobacco crop, the vines plowed under for wheat, 200 to 400 pounds of bone dust or kainit, or a mixture of the two, turned under with the pea-vines, and the wheat top-dressed in February with salt and plaster. Some lime heavily, using 100 bushels or more per acre, but this makes a coarse and rather low-priced tobacco. In Howard county, where practicable, tobacco is grown two years on clearings; then wheat, followed by clover or grass.

Tobacco-growers, in all parts of the state in which that crop is produced, agree in the opinion that with proper rotation tobacco is not more exhaustive than corn or other crops usually grown upon their lands. In southern Maryland tobacco has been grown continuously as long as on any other area of territory in the United States, and fair crops are still grown upon these lands without fertilizers.

The soils of southern Maryland abound in lime and magnesia, and the remaining elements are generally found in requisite quantity in almost all soils. The subsoil contains much potash, and the soil, derived from a conglomerate, was once rich in the acids. Another reason why these lands have maintained their fertility for so long a period is that the soil has not been washed away by heavy rains, as is the case on rolling lands.

PLANT-BEDS, ETC.

Nine-tenths of the plant-beds in Maryland are prepared without burning. Fuel is scarce and costly, and a good situation, thorough preparation, and heavy manuring are relied upon. Very few of the beds are covered. The beds, both raw and burned, are generally sown as soon as prepared. In Prince George's county seed is sown from January 1 to April 1, and in Howard county from February 15 to April 15. Hot-beds are used to a limited extent, and are commended as a surer protection against the flea-beetle.

In Prince George's transplanting begins about the 10th of May, and is continued till July 4; in Howard the work begins about the 20th of May, and is usually completed by the 1st of July.

PREPARATION OF THE SOIL FOR TOBACCO CULTIVATION.

Land intended for tobacco is plowed deeply and as thoroughly as possible during the winter or in February, cross-plowed in April and home manures applied, and again cross-plowed, usually with shovels, dragged, rolled, or harrowed until fine tilth is secured. If fertilizers are used broadcast, they are generally applied at the last harrowing.

In Howard county the usual practice is to lay off the rows three feet apart, fertilize in the drill, cover the manure with a corn-coverer or with two furrows of a light turn-plow, and lay off in checks 2 feet 8 inches or 3 feet. Hills are made in the checks, chopped fine, and leveled with the hand hoe. The practice in other counties is not materially different.

Some planters first weed with the hand hoe, then plow both ways, two furrows each time, or once through each way with the double shovel, cultivate again both ways, and finish up with the hand hoe, dressing the hills. This generally suffices upon clean land, well prepared; but, if necessary, cultivation is repeated every ten days until the plants are so large as to prevent further working. Upon most of the soils of this tobacco region it has been found that frequent shallow plowings after the plant has started into rapid growth are best, and that, in average seasons, deep plowing after the first cultivation is not advisable.

PRIMING, TOPPING, AND SUCKERING TOBACCO.

In Prince George's county priming is not done until the bottom leaves are large enough to be pulled off and saved as "ground leaves". These are gathered when the tobacco is matured and ready to be cut. The ground leaves are saved easily, and are quickly put into market. The plants are topped low, and the suckers are pinched out as fast as they appear. Cutting begins about the time the first suckers are large enough to pull off. The whole field is topped at once.

The same methods prevail throughout most of the tobacco region of Maryland. Priming is rarely done. The tops are pinched out as soon as the seed-bud appears, and cutting follows within from ten days to three weeks after topping.

In hot, damp weather the plants ripen more slowly than when warm and dry. They mature faster in dry weather, unless very cool, and "ground leaves" will accumulate.

In Prince George's county cutting begins about the first of August and continues till the last of September. In Howard the work of harvesting begins during the latter part of August, and is usually finished by the middle of September. Only five to thirty days intervene between topping and cutting.

HARVESTING AND HOUSING OF TOBACCO.

In harvesting and housing tobacco the plants are cut two rows at a time and laid on the ground, the butts a little to the right of the operator. The next two rows are then cut and laid in like manner, the butts of the last in close proximity to the first, and a boy follows, depositing tobacco-sticks at proper intervals for use in spearing. The implement used for this purpose is a spear-shaped piece of iron, with a socket, into which the tobacco lath fits. Sometimes a small trestle is used as a support for the spear, but experts do not require it. Experts place the end of a lath in the socket of the spear, resting the other end on the ground; hold the spear end with the left hand, grasp a stalk with the right at the butt end, and place it on the top of the spear, about 4 inches from the end. As soon as the spear has penetrated the stalk, release the hold of the lath with the left hand and place it on the stalk to the left of the spear point, and then press down with both hands until the spear head has passed through the stalk and the latter is fairly strung on the lath, as indicated in the illustration.

Six or eight plants are speared upon each stick. These sticks, filled with tobacco, are set up in the field, in rows, in shocks of eight or ten sticks each. A cart or wagon is driven between the rows and is loaded from either side, great care being taken not to bruise the plants in handling. The tobacco is carted to the barn and the sticks are placed on the tiers, or it is hung out of doors on scaffolds. Cutting is done in the morning, as soon as the dew is off, or after four o'clock in the afternoon on bright, hot days, so that the plants may not be sunburned.

In southern Maryland the tobacco-houses are generally large frame structures, from 15 to 20 feet high, 20 to 30 feet wide, and 30 to 60 feet long. A barn of medium size, 24 by 40 feet and 16 feet high, is capable of curing 3,000 to 3,500 pounds of tobacco, and if built of good material, underpinned with stone or brick, such a house will cost about \$400. Tobacco-houses are usually constructed somewhat open, to permit the free circulation of air, and some are so built as to admit or shut out the air at pleasure. Tobacco-sticks cost about \$1 per thousand.



Insurance may be effected upon tobacco-houses, but at high rates, and, therefore, comparatively few farmers insure their barns.

CURING OF TOBACCO.

In Prince George's county the product is all air-cured. If a damp spell occurs after the barn is filled with tobacco it is sometimes fired with wood to save it; but this is rarely done, as the product then sells only at very reduced prices. Furnaces have been tried to some extent in Anne Arundel and Montgomery counties, and in most cases the results were not satisfactory. In Montgomery about one-twentieth of the product is air-cured, the rest being cured with open wood fires; in Howard four-fifths of the crop is air-dried and one-fifth is cured with wood fires; and in Calvert, Charles, and Saint Mary's counties the tobacco is all air-cured. Lower Maryland tobacco, cured by open wood fires, is unsalable; but the highest price paid in Baltimore for tobacco grown in Maryland is for the bright "Spangled", raised in the Bay district, and cured with open wood fires.

Pole-sweat or house-burn does more or less damage every year, and is caused by hanging too close, by crowding on the sticks, or by rehanging too soon while the tobacco is in a sweat. House-burn can be prevented by having plenty of room and by proper attention to ventilation, and can be arrested by judiciously managed artificial heat. Tobacco is often much damaged by continued wet and foggy weather in barns not made tight, and especially is this the case when the tobacco, after being cured, is not run close together, so as to exclude the damp air as much as possible. The best plan to avoid injury, and that adopted by careful managers in the lower Maryland section, is to run the tobacco up in the roof-space of the barn and press the sticks close together as tight as possible, cover the floor with dry straw or hay, and make the barn as close as can be.

STRIPPING, ASSORTING, AND BULKING OF TOBACCO.

Maryland planters seldom bulk the tobacco before it is stripped. If bulked at all, it is only as a temporary expedient to keep the leaves in pliable order to be properly sorted and tied up into bundles or "hands". These "hands" contain eight to ten of leaf, ten to twelve of ground leaves, and twelve to fourteen of "tips"—the small, inferior top leaves. The air-cured tobacco of southern Maryland is usually sorted into four grades: Brights, seconds, dulls, and tips. In the Bay district more grades are made: Yellow-spangled, crop, seconds, dulls, and tips.

After the tobacco is stripped and tied it is usually put down in bulk. Bulks are constructed as follows: Logs, poles, or skids, as long as needed, are placed 2 feet above the floor of the barn, resting on blocks or other supports, and the poles, $3\frac{1}{2}$ feet apart, are covered with tobacco-sticks, laid across closely, making a platform. Two or three bundles at a time are passed to the bulker, who smoothes out the leaves and lays them on the platform, with the heads even and pointing outward, making a course all around the platform outside. Another bulker follows, laying the heads about midway of the first course, and completes a round in the same manner as the first. The heads of the inner course point outward, tails inward and lapping; making, in all, four courses of bundles in the width of the platform. A narrow bulk is made by packing on these two courses with the heads outward and a middle course. A still narrower one, made with only two courses, is the "tailing-down" mode, called by some "windrows". The narrower the bulk the less liable is the tobacco to heat; but it is more liable to dry out and get out of order for prizing.

Tobacco stripped late in the season and in good order is rarely hung up again, but is bulked as stripped or packed for sale.

The length of time tobacco is permitted to remain in bulk depends upon its condition when thus packed down and the option of the planter. If bulked in soft condition, it will not keep sound after the weather becomes warm, but will ferment and spoil. Thoroughly dried out, and then caught in proper condition—leaves supple and stems dry—and bulked or packed, it will keep safely. A great deal of tobacco is damaged every year in bulk and hogshead by neglecting to bulk or pack in proper condition.

Bulking gives a fan-like shape to the bundles, prevents injury from atmospheric influences, and is regarded as an essential part of the "conditioning" process necessary to make it ready for prizing into hogsheads. If bulked in proper condition, the "sweat", through which tobacco always passes when closely packed, is only moderate, the leaf is improved, and the sweet flavor of a really good tobacco is manifest. If the sweating, either from being bulked or packed in bad condition, is immoderate, or allowed to go on till great heat is attained, the leaf and stem become moldy or "funked", and the quality is seriously damaged or the tobacco utterly ruined.

The proportion of "funked" tobaccos, or such as are damaged by excessive fermentation, is greater in air-cured than in fire-cured tobacco, the leaf being more thoroughly dried by artificial heat. The proportion of damaged tobacco varies with the seasons, it being in some years less than 5 per cent., and in others more than 10 per cent. of the crop.

For prizing tobacco the old lever beam is most in use. This is usually made on the farm, is easily constructed, and at small cost, varying from \$5 to \$10, according to material and workmanship. Screws of wrought or of cast iron are also used by some planters, and cost from \$25 to \$50 each. The screw is far more convenient than the lever, and is gradually coming more into use.

SELLING OF TOBACCO.

Maryland tobacco is nearly all prized and sent to Baltimore, where it is stripped of the hogshead or tierce, broken in several places, and samples drawn therefrom, which are intended to represent fairly the contents of the package. These samples are drawn by inspectors, and are taken by the commission merchants to whom the tobacco is consigned. The tobacco is sold by sample. The cost of selling is \$1 50 per hogshead, charged by the commission merchant and paid by the planter or owner. There is also a charge of \$2 per hogshead for inspection, storage, etc., called outage, which is paid by the purchaser; but the whole cost of \$3 50 per hogshead comes at last out of the tobacco. The usual cost of hogsheads is \$1 50 each.

Tobacco inspection in Maryland is under state control. The board of trade of Baltimore has recently petitioned the governor and members of the legislature to repeal the present tobacco-inspection laws of the state.

The best qualities of yellow tobacco, grown in Montgomery county, sell from \$18 to \$20 per hundred, and inferior sells down to \$3; a difference owing not to soil and cultivation only, but to the condition of the tobacco when cut and to the varying skill in curing, handling, and packing.

DISEASES OF TOBACCO.

"Red-fire", "black-fire," and "white-speck" prevail more or less every year, and "frenching" and "walloon" trouble tobacco-planters in all parts of the state where tobacco is grown. "Hollow-stalk" is found occasionally in fields of healthy tobacco. Fortunately, the loss from diseases is comparatively small, except "fire", which does more damage, one year with another, than all the others combined.

ENEMIES OF TOBACCO.

The Maryland planter has no peculiar experience with insects not indicated in Chapter XX.

CIGAR TOBACCO.

The small product of cigar tobacco raised along the border in northeastern Maryland finds its way into Pennsylvania, and is absorbed with the product of that state. A few samples of this type are sent to Baltimore.

COST OF RAISING TOBACCO.

The rate of wages paid for field hands averages about \$8 per month for good men; by the day, for men, 50 cents, and for women, 25 cents, with board. Most of the farm labor is hired by the month and by the day; but occasionally a man is hired by the year at from \$80 to \$110, with board.

Lands capable of producing, without manure, 1,000 pounds or more of tobacco sell at from \$30 to \$50 per acre; and inferior lands, capable of producing, without fertilizers, 450 to 500 pounds per acre, are valued at from \$8 to \$10 per acre. Location and improvements are factors influencing the prices of farming lands.

Tobacco hands command no higher wages than other field laborers, but experienced sorters and packers are paid higher prices.

Lands are rarely rented at a fixed price per acre. The usual custom is for the cropper to pay rent in kind: from one-half to one-fourth of the crop, according to the fertility of the soil and other contingencies.

Estimates of the cost of raising tobacco vary widely. In southern Maryland the average cost of production is placed at \$4 80 per hundred pounds; in western Maryland the average is estimated at \$6 08 per hundred pounds. The average number of acres planted to the hand in southern Maryland is 4 acres; in western Maryland, 3 acres. Planters are of the opinion that, under adequate supervision, the cost of production is somewhat decreased in a large crop.

The following statement shows the total yield of tobacco in pounds, the acreage, yield per acre, value in farmers' hands, value per pound, and value per acre in the state of Maryland, for the years 1876, 1877, 1878, and 1879:

Year.	Amount produced.	Acreage.	Yield per acre.	Value of crop in farmers' hands.	Value per pound in farmers' hands.	Value per acre.
	<i>Pounds.</i>		<i>Pounds.</i>		<i>Cents.</i>	
1876.....	33,153,370	37,949	888	\$1,610,690	4.87	\$43 12
1877.....	30,123,210	43,500	890	1,674,750	4.23	38 04
1878.....	30,420,171	34,397	887	1,444,680	4.75	42 00
1879.....	26,082,147	33,174	683	1,825,750	7.00	47 83

In this table the figures given for the first three years are estimates from the most reliable data attainable, and only those for 1879 are from the census of 1880.

CHAPTER X.

CULTURE AND CURING OF TOBACCO IN MISSOURI.

The French and Spanish settlers of Missouri raised tobacco for their own consumption, but it was not until about the year 1822 or 1823 that it began to be grown as a staple crop. This cultivation was begun in Pike and the adjoining counties by emigrants from Virginia. It became a staple crop in Chariton county about the year 1834, and continued to increase in quantity until that county produced fully one-third of all that was grown in the state. No other state in the Union, however, has shown such rapid fluctuations in the amount of tobacco produced as Missouri, and this makes it rather difficult to point out with any degree of precision the tobacco-growing districts. When tobacco commands a good price, two-thirds of the counties of the state produce it as a staple crop, but with the fall of prices stock-raising and grain-growing are substituted in its place. In 1850 Missouri ranked as fifth among the states in the production of this staple, raising 17,113,784 pounds; in 1860 it fell to seventh, though producing 25,086,196 pounds; and in 1870 it took the sixth place, though falling off in production more than one-half, reporting for that year 12,320,483 pounds. The following table will show the production for the past four years:

	Pounds.
1876.....	43,245,000
1877.....	33,978,000
1878.....	22,560,000
1879.....	12,015,657

Only the figures for 1879 are from census returns.

In 1876 Missouri ranked third in production, Kentucky and Virginia only excelling it, but it fell to the ninth place in 1879. The very rapid decline for the few years past is due to the overproduction in the country at large of the types which are specially grown in Missouri and to the heavy decline in prices; also in part to the revolution which has taken place among the plug manufacturers of the United States in the substitution of White Burley for fillers. The seed of the White Burley was introduced into the state from Mason county, Kentucky, in 1878 and 1879, but from some unknown cause it failed to germinate well, and, as a consequence, the acreage in tobacco was very largely decreased in every portion of the state. At least one-half the crop of 1880 is estimated to be of the White Burley.

CHARACTER OF MISSOURI TOBACCO.

As a tobacco state, Missouri, previous to the change alluded to, presented some original characteristics, to some extent still prevailing. All types, except those used in the manufacture of domestic cigars, are grown, from the heaviest, darkest shipping leaf to the light, bright wrapper, so much sought by domestic manufacturers. The heavy tobacco of Missouri has also great absorbent or "drinking" qualities.

Missouri lugs make the best ordinary smoking-tobacco, this grade from the districts producing manufacturing tobacco being lighter than the lugs grown in the shipping districts. The shipping tobacco of Missouri is rather coarse, with large stems and fiber, being grown generally on the rich bottom lands. It contains less gum than that produced elsewhere, and is put up as dry as is possible without breaking. It resembles the Henderson (Kentucky) tobacco, but is not so uniform in color, varying all the way from a bright yellow to a dark red or brown. The color is naturally from a rich dark brown to a high-colored red leaf. When cut green and cured up it is generally very dark, while that which is allowed to ripen fully cures up a more desirable color. Grown on lowlands or prairies, it produces a rich brown and large leaf, which is much sought for export. The manufacturing leaf is grown on the hill lands, particularly on the white-oak soils. The chief difference between the manufacturing and the export tobacco is that the former is of fine fiber and texture, brighter in color, and is not so heavy as the latter.

PHYSICAL FEATURES AND SOILS.

The heavy tobacco district occupied by the counties of Carroll, Livingston, Saline, Howard, Chariton, Linn, Macon, Randolph, Shelby, Monroe, and Boone is one extended plain, with a rolling surface and a gentle declination toward the southeast. Through this plain the Missouri, Grand, Chariton, Lamine, and Salt rivers have cut their valleys to the depth of 200 feet, while numerous smaller streams intersect all parts of the district, with channels deep and wide in proportion to the water discharged. The undulating character of the surface and the channels of the streams furnish a complete drainage. For the most part the coal measures underlie the whole district, save in portions of Saline, Howard, and Boone, where the Subcarboniferous, Devonian, and Silurian rocks successively appear, and also in the largest parts of Shelby and Monroe, which are underlaid chiefly by the Subcarboniferous rocks. All of these consolidated strata are so deeply covered by the Quaternary deposits that they have exerted little or no influence in the formation of the soil. Resting on the consolidated strata are thick beds of glacial, lacustrine, terrace, and alluvial formations. The glacial strata of bowlders, sands, and clays are sparingly developed, and rest upon the coal measures and older rocks where they come to the surface. The lacustrine strata, known

as bluff, bury the glacial drift deeply. The surface deposit is the bluff loam, varying in thickness from a few feet to 200 feet. This deposit is rich in lime, magnesia, potassa, soda, phosphoric acid, silica, and alumina. The bottom prairie, or lower terrace, and the alluvial formations are similar in composition to the bluff, save that the material is coarser and more porous. This district is about equally divided between timber and prairie, the timber occupying the larger area in the river bottoms, and the prairie in the highlands.

The upland soils were formed of the bluff marls, and the bottom soils of the bottom prairie and alluvial formations of the river valleys. There are several distinct varieties of soil, distinguished by the grasses and weeds in the prairies and by the trees in the forests.

In the manufacturing district, composed of the counties of Callaway, Pike, Montgomery, Lincoln, and Warren, on the north side of the Missouri river, and Osage and Franklin, on the south side of that stream, the geological and topographical features are greatly varied, but the soils north of the Missouri river resemble those already described. In those counties lying north of the Missouri river the country gradually rises from the mouth of that river along the dividing ridge toward the northwest. From the water-shed between the two streams the slope is very gentle toward the Mississippi on the east and the Missouri on the south. Numerous tributaries to these streams drain the entire area. The general surface is undulating, with abrupt declivities to the larger streams, and the geological features are much more varied than in the heavy tobacco area. The strata below the surface deposits are composed of the rocks of the coal measures, Subcarboniferous, Devonian, and Upper and Lower Silurian.

The Quaternary deposits so completely cover these rocks that they have very little influence on the soil save along the bluffs of the streams and the more broken portions of the district. The calcareo-magnesian, along the bluffs of the Missouri, are the most extensive. These warm, rich soils produce a superior article of tobacco. The bluff loam covers all the uplands of this district (save the few areas mentioned above) to depths varying from 5 to 100 feet; consequently the upland soils derive their mineral characteristics from it. The alluvium and bottom prairie formations underlie all the bottom lands and form the bases of their soils, and these formations are nearly alike. The district is about equally divided between prairie and timber lands, and a considerable portion lies in the river bottoms. Elm lands occupy considerable areas in Pike and Callaway counties and smaller areas in all the other counties. Resin-weed lands also occupy considerable areas in the prairie region adjacent to the elm lands in the timber. Clearing up and cultivating these lands has removed the natural growth of trees, weeds, and grasses, which indicate the quality of the soils; but the crops produced on them fully sustain their early reputation for fertility. Hickory and prairie land of the same quality are found in all the counties of the district, and occupy fully one-third of the upland. These hickory lands are interspersed with and adjacent to the elm lands, and pass by imperceptible gradations from the one to the other, both soils producing large crops of good tobacco. White-oak lands occupy ridges where the lighter materials of the soil have been washed away. They sustain a growth of white and black oak, shell-bark and black hickory, dogwood, sassafras, red-bud, and fragrant sumac. The surface soil of these white-oak lands is not so rich as the last-named variety, but the subsoil is better, as has been shown by analyses at various depths. This soil occupies considerable areas in this district, and a large part of the tobacco is raised on white-oak lands. The yield ranges from 500 to 1,000 pounds per acre, and the quality of the staple is better, as a rule, than that produced on richer lands. Bottom timber lands cover large areas of the river counties, and yield the largest crops of tobacco produced in the district. Many of these counties formerly produced large quantities of tobacco, but in late years the farmers have found other crops more profitable, and their tobacco-barns, in many cases, have been left to decay.

Franklin and Osage counties have a good diversity of surface configuration. The surface was originally an undulating plain, but the Missouri, Osage, Gasconade, Meramec, and other streams have cut through its deep, broad valleys, usually bounded by abrupt and mural bluffs. In places the ascent to the plain above is by gentle acclivities. The geological features are very different from those of other districts described. The consolidated strata are the magnesian limestone series of the Lower Silurian system, consisting of sandstones and magnesian limestones, containing many beds and nodules of flint. The bluff loam is well developed on the bluffs of the streams, and is spread more sparingly over the interior upland portions of the district. The alluvium is spread over the valleys of all the large streams. The soils of these two counties are somewhat different from those already described. There is very little hackberry, crow-foot, elm, or resin-weed land in the district; but hickory lands prevail to a limited extent, more or less modified, and pass into one or the other of the following varieties: White-oak lands prevail on the ridges leading to the Missouri bluffs, and in some of the interior parts of the counties; and post-oak lands occupy the broad, flat ridges away from the river bluffs, where the bluff formation is so changed as to be much more compact and argillaceous and less calcareous and sandy. The growth is post oak, with very few black and Spanish oaks, hickory, red-bud, and dogwood. These lands cover large areas, and are highly esteemed for tobacco. They will not prove so durable as the soils already described. Magnesian limestone soils are based upon the magnesian limestone series or the mineral-bearing rocks of southern Missouri. They produce a great variety of trees and shrubs, among which are black and white walnut, black gum, elms, sugar maple, honey locust, rock chestnut, scarlet, laurel and white oaks, ash, hickory, buckeye, hazel, dogwood, and haws, and grapes are often conspicuous.

CLIMATE.

Missouri is subject to all the advantages and disadvantages of an inland or continental climate. The influences of its two great rivers—the Mississippi, on its eastern border, and the Missouri, running through the center of the state, and their various tributaries—favorably modify its climatic condition. The elevation above the sea varies from 300 to 400 feet in the southeastern portion of the state, and from 1,200 to 1,600 in the southwestern portion. Accurate meteorological observations for any extended period have been only made at Saint Louis. According to the report of the signal officer at that point the mean temperature at Saint Louis from November 1, 1870 (the time at which the observations commenced), to October 31, 1880, has been as follows for the several seasons: Spring, 55 degrees; summer, 77.1; autumn, 55.9; winter, 34.5. The highest temperature recorded during the ten years in which observations have been made was 101 degrees, and the lowest 16, the average yearly fluctuations being 50.7, and the average mean temperature 55.6. The mean annual rainfall for the same period was 39.67 inches, and the mean of the prevailing winds has been south. The daily changes of temperature are ordinarily not more than 20 degrees, but occasionally reach 30, and even 40 degrees. The winters are variable, alternating between cold spells and mild and open weather. Notwithstanding the large rainfall, the climate may be classed as a dry one, as the most abundant rains fall in a very short space of time, and clear skies are the rule and cloudy and overcast ones the exception. Evaporation is rapid, and the dew point is consequently a high one. The prevailing winds are south and southeast in the warmer seasons and west and northwest in the colder ones.

CHARACTER OF PRODUCT AND PROPORTION OF GRADES.

HEAVY TOBACCO DISTRICT.

By far the largest proportion of tobacco raised in Missouri heretofore consisted of a heavy, substantial leaf, grown principally in the following counties, viz: Chariton, with a crop ranging in quantity from 4,500,000 to 14,000,000 pounds, as in 1876, the average annual production of the county for ten years being about 9,000,000 pounds; Randolph, Howard, and Boone, with an average annual production of 6,000,000 pounds; Saline, with an average crop of 2,000,000 pounds; Carroll, Livingston, and Linn, with an average production of 2,500,000 pounds; and Macon, Shelby, and Monroe, with an average crop of 2,000,000 pounds.

This group of counties may, for convenience of description, be called the heavy tobacco district. All the product of this district is bought up by rehandlers in the principal towns.

Though the largest proportion of the tobacco of this district has been prepared for the British market, yet a small part of it has been taken by the trade in the United States on account of its sweetness and toughness—the lugs and common dark leaf by the manufacturers of lower grades of smoking-tobacco and plug tobaccos, and the finer parts of the crop for the better grades of chewing-tobacco.

It is estimated that of the crop grown in this district in 1879 the percentages of grades were as follows: Dark shipping, 33 per cent.; fillers (one-half White Burley), 30 per cent.; smokers, 8 per cent.; wrappers, 2 per cent.; cutting, 10 per cent.; nondescript, 17 per cent. Ten years previously the proportions of grades were as follows: Dark shipping, 50 per cent.; sweet fillers, 10 per cent.; cuttings, 10 per cent.; wrappers and smokers, 10 per cent.; nondescript, 20 per cent.

The requirements of the home manufacturers and the dullness of the markets abroad have produced the changes indicated, and the shipping and stemming types, suitable for home consumption, have greatly improved.

MANUFACTURING DISTRICT.

The annual average production of this district is about 3,850,000 pounds. It produces a very fine grade of manufacturing tobacco, having a fine fiber, and the crop contains a fair proportion of colored and yellow leaf, which approximates in character the finer styles of Virginia leaf.

Callaway, Osage, and Franklin counties raise a fair proportion of bright wrappers, which have been valued highly by manufacturers in former years, but are rather too small for western manufacturers. Small crops of a mixed character are raised in Saint Charles, Laclede, Dallas, Webster, Greene, and other counties of Missouri. Jackson county, in the western part of the state, raises a small quantity of very fine tobacco, resembling that grown in Callaway county. It is generally conceded, however, that the latter county raises the finest tobacco grown in the state, rivaling in the brilliancy of its yellow color the hickory leaf of autumn. The light wrappers, fillers, and smokers grown in this county command very high prices, some of the wrappers selling in the Saint Louis market for 50 cents per pound.

The product of Montgomery, Lincoln, Warren, and Pike is used for plug fillers almost exclusively, but the crop has been gradually decreasing in quantity for several years. All the tobacco grown in Pike county is consumed at the manufacturing establishments situated in the county.

The following will show the production of the several counties in the manufacturing district during the past four years, only the figures for 1879 being from census returns:

Counties.	1876.	1877.	1878.	1879.
	<i>Pounds.</i>	<i>Pounds.</i>	<i>Pounds.</i>	<i>Pounds.</i>
Callaway	1,022,865	1,450,385	855,346	570,231
Franklin	108,792	100,587	104,610	94,154
Lincoln.....	910,420	924,270	900,280	308,090
Montgomery.....	428,961	475,421	213,622	181,761
Osage.....	118,876	120,476	96,572	52,010
Pike.....	880,788	910,906	583,390	408,473
Warren	174,821	184,362	146,321	80,672
Total.....	4,551,523	4,184,497	2,606,141	1,701,391

All tobacco raised in the state outside of the manufacturing district may be referred to the heavy shipping grades, except about 15 per cent. of White Burley.

KINDS OF SOILS PREFERRED FOR TOBACCO IN DIFFERENT COUNTIES.

Referring to the schedules returned from Missouri, we find the following descriptions of soils preferred for tobacco:

CALLAWAY.—For growing manufacturing tobacco, white-oak ridge land, with scattering hickory along the water-courses, freshly cleared; for shipping tobacco, river and creek bottoms and black-hickory lands, with a few black oaks.

CHARITON.—For fine tobacco, a grayish soil, clayey and sandy loam on uplands, the original growth of which is white oak, linden, hackberry, with papaw undergrowth. Alluvial soils are cultivated to some extent. Rich, hilly lands are best adapted to the growth of White Burley. It will "scab" on bottom lands.

CARROLL.—Clay loam, freshly cleared, preferred; original growth, hickory and white oak.

FRANKLIN.—Upland clayey soils, having a rolling surface, known as oak and hickory lands, make the finest tobacco.

HOWARD.—White-oak lands, freshly cleared. A large proportion of the crop is planted on old lands, which produce the heaviest tobacco.

LINCOLN.—Freshly-cleared white-oak soils, fine, sandy, and clayey on uplands; white oak, ash, and walnut growth.

LINN.—Hickory and pin-oak soil on uplands, gray in color, with a pale yellowish subsoil.

MACON.—Light, sandy loam, on rolling lands, with a timber growth of hickory and white oak. Clayey soils produce heavy tobacco; sandy loams a bright fancy type, in demand by home manufacturers.

OSAGE.—Both river bottoms and uplands are planted in tobacco, the former making the heaviest article, and the latter the finest and best for the manufacturer. White oak is the characteristic growth on the best upland soils.

RANDOLPH.—Good sandy soil or limestone land. The best and finest tobacco is grown on new lands, which for two successive years produce the high-priced fancy grades, and sometimes, but rarely, a good-colored leaf is grown on old lands. The soil preferred has a strong white-oak growth, and is underlaid with limestone. Other characteristic trees on best tobacco soils are hickory, linn, hackberry, pin oak, and post oak.

SALINE.—All kinds of soil are cultivated in tobacco, viz, prairie, bluff loam, timbered, and bottom lands. The timbered bluff-loam land is preferred, which has a tree-covering of white oak, sassafras, and hickory. Soils upon which black oak and wild cherry grow are also admirably adapted to the growth of tobacco.

Tobacco grown upon prairie soil is the least desirable of any grown in the state, being coarse, deficient in gum, with a leaf too thick and too lifeless for the requirements of the domestic manufacturer, yet too deficient in fatty qualities to make a good shipping leaf.

A growth of white oak and linden, with papaw undergrowth, indicates the best soil for the finest grades of manufacturing leaf. The heaviest shipping leaf is grown upon soils the original timber of which was burr oak, red elm, and walnut. The sandy soils do not grow as heavy a leaf as the more silty, argillaceous soils.

It may be said generally for all the counties of Missouri that the heavy types are grown upon rich, clayey soils, and the finer types upon the thin ridges. For growing cutting tobacco new ground is preferred; for fillers, new ground and clover fallow; for shipping leaf, bottom lands, manured lots, and very fertile uplands; and for the production of fine yellow wrappers and smokers thin uplands, freshly cleared, with a characteristic growth of hickory and white or post oak.

All soils for tobacco must be well drained. It is estimated that the tobacco grown upon lands freshly cleared is worth in the market about 50 per cent. more per pound, on an average, than that grown on old lands. The condition of the soils is generally very good, being loose and porous, and while they wear easily on rolling surfaces they are

exceedingly durable upon level areas. Some of the clayey soils are refractory, and require to be broken in the fall, so that they may be ameliorated by the winter freezing. The bluff loam, owing to its large content of sandy material, as well as the deep, black, sandy soils that prevail in the bottoms, is always in fine tilth when well broken, and seldom compacts so closely as to diminish the vigor of vegetable life, and owing to its powdery condition it readily supplies to the plant the food with which it is so freely charged. By far the largest proportion of the tobacco crop of the state is grown upon this loam and upon alluviums derived, in part or in whole, from its erosion.

Very little land is turned out as old fields and abandoned in Missouri, but a few spots here and there may be seen on abrupt declivities, where the surface soil has been removed by heavy rainfalls.

VARIETIES GROWN IN THE HEAVY TOBACCO DISTRICT.

CHARITON AND CARROLL COUNTIES.—Previous to 1880 Yellow, Silky, and Blue Pryors were grown more extensively in these counties than any others. A small percentage of Shoestring and One-sucker was planted, and some Orinoco, Little Vick, and Frederick. The Shoestring variety is less liable to be broken by heavy winds, and is therefore preferred for prairie lands. Shipping leaf is mostly made of the Blue Pryor, manufacturing fillers of the Yellow and Silky Pryors, and stemming tobacco of the Orinoco and Frederick, the two latter having very wide leaves. The White Burley was extensively planted in 1880.

HOWARD COUNTY.—Orinoco is largely planted on white-oak hill lands, Blue Pryor on bottom lands, the White Burley on clover lands and on lands freshly cleared, and the Shoestring on open prairie.

RANDOLPH COUNTY.—All the varieties which are grown in Chariton county, with the addition of Medley Pryor and Red Burley, are produced in this county. The last-named variety is used for making cutters, and is grown for the most part on freshly-cleared white-oak lands. The Medley Pryor makes a good shipping leaf, and finds its most congenial soil on creek bottoms and on old manured lots.

The varieties grown in the remaining counties of the district do not differ from those already given.

VARIETIES GROWN IN MANUFACTURING DISTRICT.

CALLAWAY COUNTY.—Golden Pemberton, Tomahawk, Silky Pryor, and White Burley are most generally cultivated in this country. The first resembles both the Orinoco and the Yellow Pryor, and is supposed to be a sub-variety from cross-fertilization of the two varieties. Its habit of growth is like the Orinoco, but it cures to a bright-yellow color much more easily. It is sweeter and heavier than the Yellow Pryor, and colors like it, but in general appearance, weight of leaf, and sweetness of flavor it is like the Orinoco. It is a great favorite among growers for making yellow wrappers and smokers. The Tomahawk resembles the Golden Pemberton, but has a quicker growth. It is the sweetest and most easily cured to a bright yellow of any variety yet produced in the state, but its leaf is too short to make the highest-priced wrappers. The Silky Pryor is thought to equal the Tomahawk in its growing and curing qualities, having sufficient length of leaf, but lacking sweetness of flavor. The White Burley, up to 1880, had not been tested here sufficiently to justify an opinion as to its merits. A few who occupy farms on the river and creek bottoms plant the Orinoco, Brittle-stem, and Blue Pryor, and make a good quality of shipping leaf. The first three varieties mentioned are held in high repute by manufacturers, and are grown upon a light sandy soil with a yellow-clay subsoil. If planted upon the more fertile black soils they approximate the shipping varieties in general coarseness of appearance, but without the richness or size of the shipping leaf. Only the white-oak ridge lands of the county supply soils well adapted to the growth of the yellow tobacco. The cigar varieties, when tried, failed in quality, and they are not planted to any extent.

PIKE COUNTY.—A variety called Yellow Orinoco is grown in this county in addition to the kinds already mentioned as growing in Callaway county. This is said to have a long, large leaf, and varies very much in color and in quality upon different soils. The variety known as the Golden Pemberton, already described as growing in Callaway county, when grown upon the soils of Pike county has a thin, light leaf, curing with a considerable variation in color, and is unsatisfactory when employed for manufacturing purposes. In this county the yellow Orinoco is preferred because of its richness, sweetness, and delicacy of flavor. Here, as in Callaway county, the finest tobacco, and that which commands the highest price, is grown on white-oak ridges, while that grown on elm and hickory land is coarse in structure and strong to the taste.

LINCOLN COUNTY.—Two kinds of Orinoco are grown; one suited for making heavy shipping tobacco, and the other, doubtless the Yellow Orinoco, suitable for manufacturing purposes. The first is planted on the elm and hickory lands, and the last on white-oak lands. The White Burley does not succeed well except on rich river and creek bottoms, and the Yellow Pryor, which is grown to some extent, is light and trashy.

All the other counties in the district raise the same varieties, some farmers preferring one and some another, according to the soils and the purposes for which the tobacco is grown.

Of the counties included in the manufacturing district Callaway, Pike, Osage, and Franklin attempt to grow

tobacco for manufacturing purposes exclusively, while Montgomery, Lincoln, and Warren grow both manufacturing and shipping tobacco. In the first group of counties the proportion of types, as compared with 1869, is as follows:

Type.	1879.	1869.
	<i>Per cent.</i>	<i>Per cent.</i>
Dark shipping	20	40
Fillers	40	20
Bright wrappers and smokers.	20	.....
Cutting	10	.....
Nondescript	10	40

It will be seen that the advance has been very rapid from low types of shipping leaf and nondescript to fillers and bright wrappers and smokers.

In the second group of counties a comparison of the proportion of types for the same period shows:

Type.	1879.	1869.
	<i>Per cent.</i>	<i>Per cent.</i>
Dark shipping	35	35
Fillers	35	25
Bright wrappers and smokers.	20	20
Nondescript	10	20

These are merely approximations, but they indicate that there is a general tendency to abandon the cultivation of the heavier export types and grow such varieties as may be used most profitably in domestic manufacture. The same may be said of the region known as the heavy shipping district, where the change is going on with much greater rapidity, as the following will indicate:

Type.	1879.	1869.
	<i>Per cent.</i>	<i>Per cent.</i>
Dark shipping	33	60
Fillers	30	10
Bright wrappers and smokers.	17	.....
Nondescript	20	30

It was estimated that fully half the crop of 1880 would be suitable for the domestic manufacturer. The quality of shipping and stemming sorts is gradually deteriorating under the discouragement of the low prices. On the other hand, there is a decided improvement in the quality of the sorts suitable for manufacturing, some of the worst and some of the best types of tobacco being grown side by side on soils identical in character, productive capacity, and exposure.

PLANTING, CULTIVATION, CURING, AND HANDLING OF THE TOBACCO CROP.

In the cultivation of the crop in Missouri, especially in the heavy tobacco district, fertilizers are rarely used. Most of the land is freshly cleared, which, after growing three or four crops of tobacco successively, is devoted to the production of corn, wheat, or hay. When grown upon old land, the crop is rotated with wheat and clover. Of the land planted in tobacco one-sixth is virgin soil, one-fourth has borne one crop, one-fourth two crops, one-fourth three crops, and one-twelfth is old manured land. The tobacco of the second year on fresh land is the heaviest, and there is a deterioration of 10 per cent. in quality and quantity after that time.

The time for sowing seed-beds is the first week in March, and the transplanting is generally done from the 1st to the 20th of June. Beds are protected from the fly by a covering of muslin, and also by sprinkling them with a diluted preparation of *aqua ammonia*.

The land intended for tobacco is turned to the depth of 6 or 8 inches, sometimes in the fall, but generally in March, and again in May. After the last breaking it is well harrowed two or more times, is then laid off $3\frac{1}{2}$ feet each way, and hills made at the points of intersection. Sometimes two furrows are thrown upon the first, making a ridge. The top of this is cut off and patted at intervals of $2\frac{1}{2}$ to $3\frac{1}{2}$ feet, and the plants are set out at these places. In the preparation of virgin soil the leaves and trash which remain after the wood and brush are taken away or burned up are raked in piles and burned. A jumping colter is then used for breaking, going over the land twice, the last plowing crossing the first. It is then harrowed, rebroken with a turning-plow, and again harrowed. The roots are removed, the land is laid off in rows $3\frac{1}{2}$ feet apart one way, and the plants are set on the edge of the furrow, $2\frac{1}{2}$ feet apart.

The amount of cultivation which the crop receives depends more upon the time at the planter's command than upon anything else. Each one, however, endeavors to plow the crop sufficiently often to keep down the weeds and grass, which, upon all land except virgin soils, is about three times, following the plows each time with hoes and cutting away any grass or weeds which may be left. On virgin soils the cultivation is much less, being restricted to about two plowings, only one being given when it is desired to make a very fine article of tobacco.

Some good growers do not prime the tobacco plant; others pull off five or six of the lower leaves at the time of topping, which takes place when a sufficient number of leaves has developed on the stalk, generally when the button makes its appearance. If the planting be early, and a heavy article of tobacco is desired, the plant is topped to ten leaves, and to a less number as the season advances. On virgin soils the plant is topped to twelve or fourteen leaves; the White Burley variety usually to fourteen or sixteen leaves. This latter variety is only suckered twice, while the heavier varieties are suckered three or four times before ripening. The usual time between topping and cutting is from four to six weeks, the shorter time being sufficient to mature the White Burley. The cutting season begins September 1, and continues throughout the month, sometimes running into October. The only difference to be observed in the method of cutting tobacco in this district and in the Lower Green River district of Kentucky is that in the latter district the plants are split with a knife before they are severed and afterward straddled over a stick, while in Missouri the practice is to sever the stalk with a knife, chisel, or hatchet, and spear the plants upon a stick, as is done in Maryland and in the seed-leaf districts. Of plants of ordinary size, eight are put on a stick $4\frac{1}{2}$ feet long, but of the White Burley variety only six.

In the heavy tobacco district ninety-nine hundredths of the crop is air-cured. A very few planters use log fires, and still fewer have adopted flues. When cut, the tobacco is scaffolded in the field until partially cured, when it is removed to open barns, generally built of logs, 20 feet square. Sometimes these barns are studded with hip-rafters (*vide* cut in chapter on Tennessee), but are always so constructed that the air can have free circulation. The damage done the crop by pole-sweating varies greatly with the season, being always greatest in a hot, damp season. From four to six weeks are required for the tobacco to cure fully by the natural process of evaporation. A very small part of the crop is sun-cured on scaffolds, which process gives it great sweetness.

In the manufacturing district about 5 per cent. of the area cultivated receives a slight application of stable manure. The deterioration of the productive capacity of the soil in this district is much more rapid than in the heavy shipping district, and fertilizing or rotation of crops becomes a necessity. The rotation most generally practiced is: First year, tobacco; second, wheat and clover; third and fourth, clover; and fifth, tobacco. This rotation results in remunerative crops, not only of tobacco, but of grain and of clover.

It must be borne in mind that there is not such a difference in the constitution of the soils of the two districts as the statement above would seem to imply. In the heavy shipping district the very best soils are planted in tobacco, and they can be kept in tobacco for several years in succession. In the manufacturing district the thin white-oak soils, naturally poor and with but little strength of constitution, are utilized in the growing of the crop, and are adapted to the production of the finest types of tobacco. The time required to ripen is longer than in the heavy tobacco district, running from five to eight weeks; in fact, the plants are allowed to stand upon the hill until they turn yellow and begin to waste. The cutting begins about September 10, and continues until frost. When air-cured, it is allowed to remain on scaffolds in the fields for several days, and is then taken to the barns, and the same is done when cured with wood; but when cured by charcoal or by flues it is the usual practice to take it at once to the curing-houses and arrange it properly on the tiers. The processes of curing by charcoal and by flues are elaborately given in the chapter on North Carolina. That portion of the crop cured with wood fires is generally placed in the shipping grades. It is estimated that three-tenths of the product of the district is sun- or air-cured, three-tenths cured with wood fires, one-third with charcoal, and one-fifteenth by flues. Flues are often constructed of brick, at a cost of \$30, and old steamboat-boiler flues are sometimes utilized for curing the crop, being elevated above the floors of the barn 6 or 8 inches. The flues most generally used are made by digging trenches in the floors of the barns and covering them with sheet-iron, and have apertures on the outside of the barns for firing and for the discharge of the smoke.

In the shipping district farmers usually make two grades, lugs and leaf, and sell to redriers, who assort into long bright and short bright, long dark and short dark, bright and dark lugs, and nondescript. Occasionally a farmer will pack his crop in casks. He then makes three grades: lugs, long leaf, and short leaf.

In the manufacturing district the assorting is much more tedious, for the yellow tobacco is usually put into three or four grades, in addition to the grades already named in which tobacco is assorted in the heavy shipping district. The crop is usually prized from May until July.

The market prices for the various types and varieties of the crop are about as follows: Flue-cured yellow leaf, per one hundred pounds, \$10 to \$60 for selections; White Burley, well handled, \$6 to \$10 for the whole crop; manufacturing fillers, air-cured, \$5 to \$7 for the whole crop; shipping leaf, air-cured, \$3 50 to \$6 for the whole crop. About one-ninetieth of the crop is yellow wrapper. Where a division is made in the crop of lugs and leaf air-cured shipping will bring, for lugs, from \$1 to \$2; leaf, from \$4 to \$7 per hundred pounds.

Where the crop is sold loose to dealers it is tied in very large bundles, containing from thirty to forty leaves each, and when it is to be prized each bundle contains only eight or ten leaves. Loose tobacco is delivered to dealers in very damp condition, and they redry, reassort, and retie it. It is then bulked down, each grade being kept separate, and allowed to go through the process of sweating or fermentation.

The casks used for packing are 42 inches in diameter and 56 inches in length, and the number of pounds packed in a cask varies with the grade of tobacco, as follows: Shipping leaf, 1,300 to 1,400 pounds; lugs, 1,600 to 1,800; fillers, 1,000 to 1,200. Wrappers are packed usually in tubs 3 feet in diameter and 2 feet high, each of which contains from 50 to 150 pounds. Sometimes they are packed in boxes weighing from 200 to 400 pounds. The staves for hogsheads are sawed, and cost \$1 per hundred feet. Sixty-five feet, board measure, will make one hogshead, and 25 feet additional for two heads. Hoop-poles cost 3 cents each, delivered. Nails and cooperage make up the cost of hogsheads to \$1 90 each.

TOBACCO STRIPS.

No strips for exportation were made in the state for the year beginning June 1, 1879, and ending May 31, 1880. Previous to 1860 a very large proportion of the product of the heavy tobacco district was stemmed, the large and leafy character grown, with its great absorptive capacity, making it well adapted for that purpose.

COST OF GROWING TOBACCO.

The great fertility of the virgin soils of Missouri, their adaptation to the growth of the tobacco plant, and the small amount of cultivation required to produce the crop, reduce the cost of production to a minimum upon the richer soils. Taking as an illustration Chariton county, which occupies a central position in the heavy tobacco district, the best tobacco lands, cleared and inclosed, are worth in the market \$20 per acre, and they have the capacity to produce from 1,000 to 1,800 pounds of tobacco to the acre, varying with a favorable or unfavorable season. Assuming the average to be 1,400 pounds to the acre for best soils, we have:

Dr.	
Hire of one man for four months, at \$12 50	\$50 00
Board of hand	20 00
Use of horse and feed for same	12 25
Use of plows, wagon, barn, etc.	10 00
Use of three acres land (interest on price)	3 60
	<hr/>
	95 85

Cr.	
By 4,200 pounds of tobacco, at 4½ cents	189 00
Profit on best lands, per acre	31 05
Profit on each hand employed	93 15
Cost of production, \$2 28 per hundred pounds.	

This, it must be remembered, is for the best soils and under the most favorable conditions of culture and development. There are thin soils planted in tobacco that will not make over 650 pounds per acre, but the growth upon such soils commands a much higher price, and in this there is often a compensation for the loss in the quantity produced. The average yield per acre for Chariton county in 1879 was 937 pounds, and on this basis, taking the average price of the crop at 4½ cents per pound, the expense of labor, tools, and land remaining the same, we shall have:

Average profit per acre	\$10 21
Profit on each hand employed	30 83
Cost of production per 100 pounds	3 41

A gentleman residing in Boone county writes that he raised 40 acres of tobacco a few years since entirely with hired labor and kept an accurate account of the cost up to the time the crop was delivered at the factory. The entire product was 42,000 pounds, and the total cost of production was \$3 35 per hundred pounds. The profits arising from the cultivation of the White Burley, at an average price of 8 cents per pound (prices vary from 6 to 10 cents, crops round) and an average yield of 1,200 pounds per acre, will be: Per acre, \$64 15; per hand, \$192 15; cost of production per hundred pounds, \$2 66.

The following statement comes from a trustworthy source in Callaway county, in the manufacturing district: The price of the best tobacco lands per acre varies from \$5 to \$8 per acre. Two crops are usually given tenants for clearing and fencing the land, and some tobacco is grown on "shares". The price of labor varies from \$12 to

\$15 per month for men, and from 50 to 75 cents by the day. Half these prices are paid for women, who, when well trained, are excellent workers in tobacco. The cost of cultivating an acre in fancy tobacco is given as follows:

Cost of seed-bed for one acre.....	\$1 00
Cost of seed	25
Weeding and attention to bed.....	1 00
Rent of land (interest on price).....	50
Cost of breaking one acre twice.....	3 00
Harrowing, lining, and hilling	4 50
Drawing and setting out plants.....	2 25
Cultivating.....	5 50
Topping, worming, and suckering	5 00
Harvesting and curing with charcoal.....	20 00
Taking down, assorting, and stripping.....	10 00
Bulking and prizing	5 00
Use of horse, wagon, laths, etc.....	10 00
Delivering to market.....	2 00
	<hr/>
	70 00
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The average yield is 500 pounds; value in market, at 20 cents per pound, \$100; profit per acre, \$30; cost of production, 14 cents per pound. The enumerator's returns of the crop of 1879 in Callaway county show an average yield of 485 pounds per acre.

Planters and dealers who pack their tobacco in this district aim to get the wrappers on the market while in the sweat, and the smokers and fillers just after they have passed through that process.

An estimate given by a gentleman in Stoddard county places the total cost of production per acre at \$30 50. The yield on good soils is not far from 800 pounds per acre, though the average for the county in 1879 was only 686 pounds. Taking the highest yield, and the cost amounts to \$3 81 per hundred pounds; with the average yield it amounts to \$4 44. The price of labor in this division of the state is much lower than in other tobacco-growing sections. Good men are hired at \$10 a month and board, and excellent tobacco lands can be bought at \$5 per acre.

The following are the estimates of value per pound for the crops of the various counties reporting:

BOLLINGER.—But little sold; 10 cents.

BOONE.—Average value, 7.7 cents; cutting and Burley tobacco, 10 cents; shipping leaf, 5 cents.

BUTLER.—Average value, 5 cents.

CARROLL.—Average value, 5 cents; lugs, 2 cents; shipping leaf, 4½ to 5 cents; fillers, 7 to 7½ cents; wrappers, bright and mahogany, 10 to 25 cents.

CALLAWAY.—Average value, 8½ cents; lugs, 2½ cents; shipping leaf, 5 cents; fillers, 7 to 9 cents; wrappers, 10 to 60 cents.

CHARITON.—Average value, 4½ cents; lugs, shipping, 1 to 2 cents; leaf, shipping, 4 to 6 cents; fillers, manufacturing, 5 to 7 cents; White Burley, crop round, 6 to 10 cents; bright wrappers, 10 to 60 cents.

FRANKLIN.—Average value, 8 cents; dark shipping, crops round, 5 cents; fillers, for manufacturing, 5 to 6 cents; bright wrappers, first grade, 50 to 70 cents; second grade, 40 to 50 cents; third grade, 17 to 28 cents; fourth grade, 7 to 15 cents.

HOWARD.—Average value, 4½ cents; trash, 2 cents; medium shipping, 3½ cents; good shipping, 4½ cents; bright tobacco, 5 to 8 cents; White Burley, 5 to 10 cents.

LINCOLN.—Average value, 6½ cents; lugs, 2 to 4½ cents; fillers, 6 to 9 cents; wrappers, 12 to 20 cents.

LACLEDE.—Average value, 5 cents.

MACON.—Average value, 4½ cents.

OSAGE.—Average value, 8 cents; shipping leaf, 4 cents; fillers, 7 cents; wrappers, 10 to 30 cents.

PIKE.—Average value, 7 cents; shipping tobacco, crop round, 4½ cents; air-cured manufacturing fillers, 7 cents; bright wrappers, 10 to 27 cents.

RANDOLPH.—Average value, 4½ cents; lugs, shipping, 1 to 2 cents; leaf, 4 to 6 cents; fillers, 5 to 6 cents; wrappers, 10 to 15 cents; White Burley, 7 cents.

SALINE.—Average value, 4 cents; lugs, 1 to 2 cents; leaf, shipping, 4 to 5½ cents; fillers, air-cured, 5 to 6 cents.

STODDARD.—Average value, 5 cents; best heavy shipping, 8 cents; lugs of same, 3 to 4 cents; good air-cured fillers, 9½ cents; wrappers, 13 cents; trash and nondescript, 1 to 3 cents.

SULLIVAN.—Average price, 4 cents.

WARREN.—Average value, 7 cents; common heavy lugs, 2 cents; low leaf, 3 cents; fillers, manufacturing, 4 to 5 cents; wrappers, common, 6 to 7 cents; wrappers, fine, 8 to 15 cents.